

A black and white photograph of the USS Mississinewa (LST-1169) being raised from the ocean. The ship is tilted at a steep angle, with its bow pointing towards the viewer. Thick smoke or steam is rising from the ship's hull. In the foreground, the deck of another ship is visible, with many sailors standing and looking towards the sinking ship. Two thick ropes run vertically down the right side of the frame, likely part of the lifting operation. The background shows the ocean and a distant ship on the horizon.

# THE NAVY'S ENVIRONMENTAL MAGAZINE **Currents**

*Summer 2003*

## **USS MISSISSINEWA** REMAINS A SILENT WAR GRAVE

**CHRIMP Doesn't Crimp New London**  
**Sailors and Marines Gather at Environmental Swap Meet**  
**Navy Schoolhouses Deliver Effective Environmental Training Worldwide**



# Currents

The Navy's Environmental Magazine • Summer 2003

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In the final moments of the sinking, a devastated  
USS MISSISSINEWA overturned, displaying her two screws.

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## USS MISSISSINEWA Remains a Silent War Grave

Navy Successfully Offloads Nearly Two Million Gallons of Oil

*Currents* (ISSN 1544-6603) is the official environmental magazine of the U.S. Navy, Chief of Naval Operations Environmental Readiness Division (N45). Participating Commands include the Naval Air Systems Command (NAVAIR), the Naval Facilities Engineering Command (NAVFAC), the Naval Sea Systems Command (NAVSEA) and the Naval Supply Systems Command (NAVSUP).

*This magazine is an authorized publication for members of the Department of Defense. Statements made in the N45 Outlook column reflect the official environmental policy of the Navy. The contents in the remainder of the magazine are not necessarily the official views of, or endorsed by, the U.S. Government, the Department of Defense, or the United States Navy. Inclusion of any product or service in any Currents feature article does not constitute an endorsement by the Navy. The Navy encourages all readers to check with the appropriate supervising authority prior to using any product or service mentioned in the magazine.*

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## Realignment Part II: Further Enhancement of the Navy's Operational Environmental Readiness Posture

The spring 2001 issue of *Currents* discussed the formalization of the Navy's environmental readiness program, and the N45 structural realignment undertaken to support its successful implementation. In the two-plus years that have passed since that article was published, the concept of operational, or "mission," environmental readiness has become a fixed part of our professional lexicon, evolved in scope, and continuously legitimized as critical to the Navy's national defense mission.

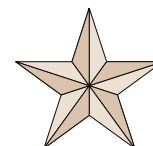
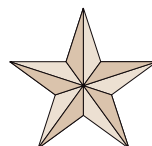
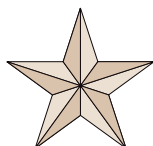
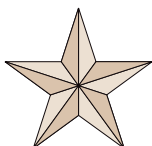
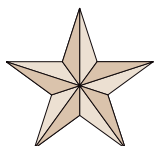
Two events occurred during fiscal year 2003 that clearly and profoundly demonstrate that mission readiness and environmental stewardship have become inextricably linked and interdependent. The first is the Range and Readiness Preservation Initiative (RRPI). RRPI is a major Department of Defense (DoD) legislative initiative designed to modify existing environmental laws to achieve a more rational and scientifically based balance between environmental stewardship and DoD's national defense mission. The second event is the standup of the Commander Navy Installations (CNI) organization (scheduled to occur at the end of FY 2003), a Navy organizational restructuring event that delineates between "mission" and "shore installation management" (SIM) responsibilities, and articulates the Navy's environmental readiness mission afloat and ashore in terms that are fully consistent with the Navy's war fighting mission and the Navy's environmental stewardship responsibilities as articulated in law.

Events like these, and the Navy's constantly expanding focus on operational environmental readiness issues, have validated the organizational changes we made in 2001, and led to another round of organizational review and analysis. Concurrent with this effort, we participated in a Workload Validation Assessment Study sponsored by the staff of the Chief of Naval Operations (OPNAV) in January of 2003.

The latter study resulted in a downsizing of the OPNAV staff including the elimination of 13 work years within our organization via the transfer of Shore Environmental Quality functions to the Navy Facilities Engineering Command (NAVFAC).

Internally, we assessed both the impact of the Workload Validation Study decision and our growing need to focus resources on operational issues. Our analysis was designed to determine how to streamline our existing organization to the maximum extent possible, while identifying those functional areas where additional capabilities were needed. Our overarching goal was to further enhance our ability to successfully address and resolve issues related to operational readiness, while establishing an organizational element dedicated to decreasing environmental program costs through innovation, implementation of best practices and adoption of enterprise solutions.

The resultant realignment of N45 resources was announced by email in July. Our new organization again shifts resources to better address operational readiness and range sustainment issues, and realigns remaining assets to expand our capabilities in selected areas. Our Environmental Restoration and Training Branch (N453) has been converted to the Special Assistant for Installation Restoration & Munitions Response (N45C). Our Operational Environmental Readiness and Planning Branch (N456) has been augmented and realigned to provide expanded support for Range Sustainment, Theater Assessment Program (TAP) implementation, the Navy's new Range Office, the Marine Mammal Program and



National Environmental Policy Act (NEPA) issues. Our Environmental Compliance and Pollution Prevention functions, previously managed by separate “Shore” (N451) and “Afloat” (N452) branches, have been consolidated into a single Afloat/Shore Environmental Systems Integration Branch (N452). Lastly, we established a Strategic Planning, Enterprise and Innovation Branch dedicated to business improvement, innovation, and cost reduction—the new N451.

In response to our downsizing and transfer of functions, and our organizational realignment decisions, NAVFAC has assumed additional responsibilities relative to providing expanded technical support to OPNAV and to echelon two commands. NAVFAC will also play an expanded role in the review and technical validation of environmental resource requirements (projects) during the Capabilities Assessment phase of the Planning, Programming, Budgeting and Execution System (PPBES) process.

services and support that enhances and sustains current and future Fleet Readiness and mission execution. CNI's core responsibility is to provide unified and consistent program management, standards, procedures, practices, and funding to manage and oversee shore installation support to the Fleet. Consistent with its mission and responsibilities, CNI will be the single budget submitting office for all SIM requirements, and will provide direction, resources and oversight for all SIM environmental programs.

Although CNI will assume all responsibility for SIM environmental requirements on 1 October 2003, all other major claimants will retain responsibility for the environmental functions required to ensure the successful completion of their mission. These “mission” environmental functions are those that support and sustain core processes and capabilities integral to Fleet operations and training, as well as research, development, acquisition, testing, operation, maintenance, overhaul and disposal of Navy platforms, systems, and ordnance.

“Our new organization again shifts resources to better address operational readiness and range sustainment issues, and realigns remaining assets to expand our capabilities in selected areas.”

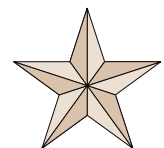
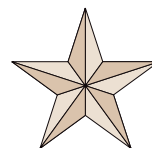
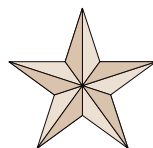
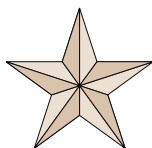
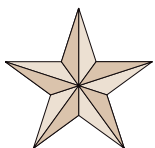
The changes outlined above reflect the full court press effort being made by Navy's Deputy Chief of Naval Operations for Fleet Readiness and Logistics (OPNAV N4) to match Fleet Readiness requirements to the mission, and to reduce current program costs via enterprise solutions, best practices and innovation. They also reflect the rapidly expanding role played by OPNAV N45, OPNAV N4 and the Navy in operational environmental matters that impact national security.

We are looking forward to and fully support stand up of the Commander Navy Installations (CNI) organization on 1 October 2003. CNI will be the Navy's single claimant for all Shore Installation Management (SIM) functions, and owner of all Navy real property (land, buildings and structures). CNI has been established to provide shore installation

The implementation of CNI, the realignment of CNO N45, and the growing demand from the Fleets to address operational environmental readiness issues will significantly impact how the Navy manages its environmental program. The establishment of CNI will provide opportunities for program efficiencies and improved effectiveness through the identification and implementation of standard procedures and best management practices. With OPNAV N45's increased focus on operational environmental functions, Navy headquarters is better prepared to help the operating forces meet current and future environmental requirements. ⚓

**William G. Mattheis**

Acting Director, Environmental Readiness Division



## Afloat Oil Water

# Separator Systems

### Meeting Pollution Prevention Challenges On the High Seas

To comply with the Act to Prevent Pollution from Ships (APPS), U.S. Navy ships are now being equipped with oil/water separators (OWS) that remove oil, fuel and other pollutants from bilge wastewater before discharging it overboard in the open seas. The implementation of this technology for shipboard use is another example of how the Navy is

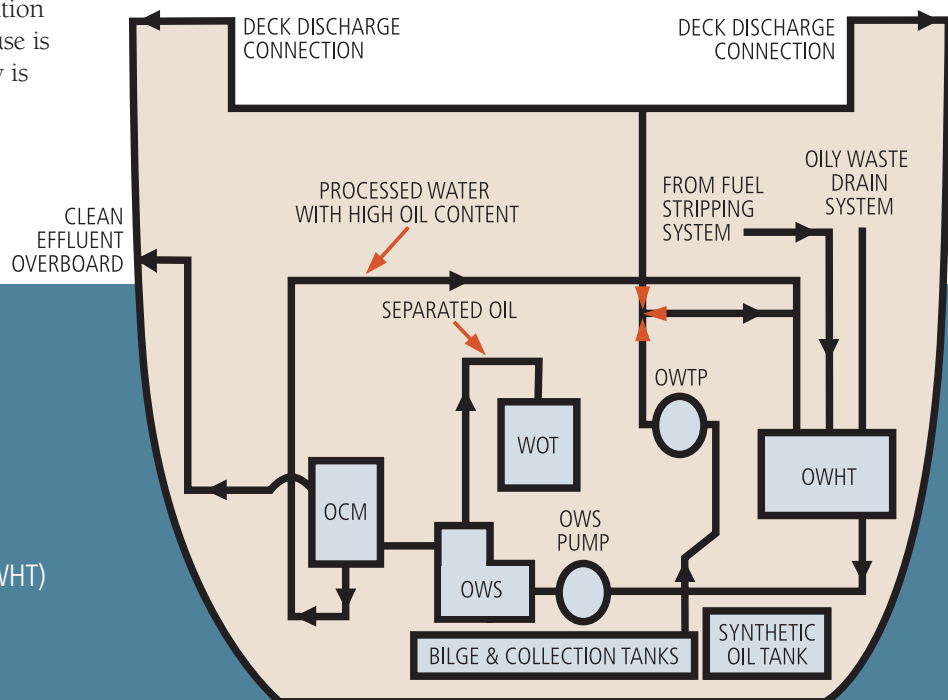
meeting the challenges for pollution prevention on the high seas.

A typical oil/water separator system onboard a U.S. Navy ship operates in the following manner while at sea. The ship's bilge is the collection basin

for a host of waste matter such as wastewater, oil, fuel, and other substances that have to be managed during long deployments. Wastewater contaminated with oil and fuel is a predominant substance found in a ship's bilge. An oil water separator provides an ideal way to reduce the volume of contaminated wastewater by discharging the treated wastewater (of less than 15 parts per million in oil content) overboard.

#### Oil Pollution ABATEMENT SYSTEM:

- Oil Water Separator (OWS)
- Oil Content Monitor (OCM)
- Oily Waste Transfer System
  - Bilge Pumps
  - Oily Waste Holding Tank (OWHT)
  - Waste Oil Tank (WOT)
- Three Way Diverter Valve





The ship's bilge is the collection basin for a host of waste matter such as wastewater, oil, fuel, and substances that have to be managed during long deployments.



All the bilge wastewater on board a ship passes through a strainer that removes large particles and debris. The strained wastewater is then piped (through a pumping process) into a holding tank, after which the OWS processes bilge and other oily wastewater to produce an effluent suitable for overboard discharge. A differential pressure switch across the strainer would signal when the strainer needs attention. The pump pushes the fluid through the separator tank and then overboard. During the oil removal cycle, the pump pushes the separated oil into the Waste Oil Tank (WOT). The

pressures throughout the system are continually monitored on the gauge panel. The flow totalizer in the waste oil line records the amount of oil discharged. System shutdown is automatic in the event of component failure or insufficient quantity of bilge wastewater. Audible and visual alarms are activated whenever automatic shutdown occurs.

The actual overboard discharge is controlled by the Oil Content Monitor (OCM) System. The OCM is designed to operate automatically with minimum operator attention. The system samples effluent water discharged from an OWS and determines the oil content by measuring the increases in turbidity (cloudiness) of the water after it is subjected to ultrasonic emulsification. When the measured oil content exceeds the selected alarm limit (15 ppm), the OCM activates alarm indica-

tors and diverts the overboard discharge to the holding tank. The OCM provides automatic control of the effluent oil concentration discharged from an OWS.

The OWS systems presently used aboard U.S. Navy ships are an example of appropriate use of technology to remove ship waste while respecting the environment. ⚓



A typical oil/water separator.

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# New Technologies for Bonding Surface Preparation

## Using Sol-Gel to Get the Chrome Out

**T**he key to successful bonding is surface preparation. The usual techniques, A-1100 or Pasa-Jell, posed availability and hazardous waste problems. Engineers at Naval Air Depot (NADEP) Cherry Point North Carolina have found a better method with the Sol-Gel, a surface preparation method for bonding nickel abrasion strips to titanium nose caps on CH-46 rotor blades. The term "Sol-Gel" is a contraction for 'solution-gelation' and refers to a series of

reactions where a soluble metal species (typically a metal alkoxide or metal salt) hydrolyzes to form a metal hydroxide.

The A-1100 silane solution, called out in the Structural Repair Manual, is not available to the field since it is mixed by materials engineering laboratories and delivered only to Depot shops. Field units, like MALS-39 who raised the field-access issue at the 2001 Environmental Information Exchange, have no access to a Depot-based laboratory. But field units and others at the Intermediate-level of

maintenance need access to a repair material.

The alternative to A-1100 for field repair was Pasa Jell 107. Although Pasa Jell can be used in the field, it poses substantial safety, health and environmental concerns. Pasa Jell contains a suite of hazardous materials, including nitric acid, chromic acid, hydrofluorosilicic acid and inorganic oxides. An additional concern is that successful bonding can only be achieved through strict adherence to process specifications, which can be difficult to attain in the field.

The NADEP Cherry Point engineers, Jack Fennell and Frank Eason, went

Their efforts turned up the Sol-Gel technology, which offers the dual advantages of using

a non-hazardous chemical dissolved in water and producing a superior bond.





## Comparison of SURFACE PREPARATION TECHNIQUES for the Bonding of H-46 Rotor Blade Wear Strip



AC-130 "Sol-Gel":  
NO undesirable adhesive failure.



A-1100 "Silane":  
MINOR undesirable adhesive failure.



Pasa-Jell 107:  
MAJOR undesirable adhesive failure.


to work and experimented with an environmentally safer and more field-friendly approach. Their efforts turned up the Sol-Gel technology, which offers the dual advantages of using a non-hazardous chemical dissolved in water and producing a superior bond.

The Sol-Gel (product number AC-130) process is relatively simple. The formula comes as a kit and is easy to

apply, with fewer processing steps and controls. It involves brushing or spraying the waterborne solution on a cleaned and mechanically activated metallic surface, then drying for a short time at ambient conditions. This is followed by the application of compatible primer and adhesive, which are cured in accordance with the manufacturers' recommendations. This simple, no-rinse process not only minimizes hazardous waste streams and worker safety/health risks, but also reduces the materials and time required for bonding. AC-130 preparations provide more reproducible and consistent surfaces for bonding than do the currently approved surface preps.

The H-46 Fleet Support Team has released a manual change to include Sol-Gel, product number AC-130. The Sol-Gel stock number is 6850-01-504-5763.

Questions regarding the use of Sol-Gel may be directed to Bill Alexander at NADEP Cherry Point, Don Knapp at

NADEP Jacksonville (904-542-4519, DSN: 942-4519), Doug Perl at NADEP North Island (619-545-9745, DSN: 735-9745) or Matt Tillman at NAS Patuxent River (301-995-7561, DSN: 757-7561). 

*Photos by Chad Robson and Lee Coppley.*



Tear Down Inspection of H-46 main rotor blade after flight-testing on spin tower. Test sections (shown left to right) are A-1100 "Silane", AC-130 "Sol-Gel", and Pasa-Jell 107.

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USS MUNSEE (ATF-107) extinguishing MISSISSINEWA fires.

Historical photos by Simon "Sid" Harris



# U.S. Navy Successfully Offloads Nearly Two Million Gallons of Oil Threatening the Ulithi Atoll



The USS MISSISSINEWA (AO-59), a 553-foot long, 25,425-ton Navy oil tanker.

Ulithi Atoll, Yap State, Federated States of Micronesia, is home to the USS MISSISSINEWA (AO-59), a sunken World War II U.S. Navy oil tanker. The MISSISSINEWA remained a silent war grave for over 50 years until it began leaking oil into the Ulithi lagoon in August 2001. Although the U.S. Navy was able to plug the oil leaks from exposed piping, the surrounding circumstances indicated the possibility of a greater release, which prompted a formal request by the Yap State Government for the U.S. Navy to offload the oil. Preparations for the offloading began in August 2002, and in February 2003, on-site offloading operations were successfully completed.

## USS MISSISSINEWA REMAINS A SILENT WAR GRAVE





USS MUNSEE extinguishing MISSISSINEWA fires.



## HISTORY OF THE MISSISSINEWA

Commissioned on May 18, 1944, the USS MISSISSINEWA (AO-59) was a 553-foot long, 25,425-ton Navy oil tanker, home to a crew of 298—twenty officers and 278 enlisted sailors. In her short career at sea, the MISSISSINEWA managed to accumulate four Battle Stars from actions surrounding Yap, Peleliu, Leyte and Okinawa.

On the morning of November 20, 1944, the MISSISSINEWA was fully loaded with various types of fuel and lubricating oil for surrounding ships and aircraft, including 440,000 gallons of highly volatile aviation gasoline. The oil tanker dropped anchor that fateful morning in the tranquil waters of Ulithi Atoll, a member of the Federated States of Micronesia, in the Western Sector in the Caroline Islands chain. Located 1,300 miles south of Tokyo, the once Japanese-occupied Ulithi is made up of a series of islands forming a well-protected lagoon covering an area of approximately 200 square miles. This made for an excellent staging area for the U.S. Navy armada of battleships,

aircraft carriers, destroyers and many other support ships. In September 1944, American troops took control and turned it into the largest Naval Base in the area. Serving as a supply and repair facility, Ulithi welcomed over 700 U.S. Pacific Fleet ships.

Just as the MISSISSINEWA dropped anchor, a “Kaiten”, or a manned torpedo version of a “Kamikaze”, was launched from a Japanese submarine; the MISSISSINEWA was its target. Extending 48-feet, and containing a 3,400-pound warhead and one pilot, the “Kaiten” penetrated the starboard side of the MISSISSINEWA, resulting in a massive explosion that instantly killed many crewmembers.

The men aboard the ship were forced over the sides into the burning oil-coated waters. Boat crews from the USS LACKAWANNA (AO-40) were ordered to pull the men out of the water, rescuing over 200 sailors while the fleet tug USS MUNSEE (ATF-107)

worked to extinguish the fires. However, the MISSISSINEWA was devastated. Overwhelmed by water and structural damage, the MISSISSINEWA and 63 of her sailors were lost. As Simon “Sid” Harris, a crew member on the MUNSEE recalled, “The stern rose, displaying the huge, twin, four-bladed screws in a final salute and then disappeared beneath the burning, oil-coated sea.” The attack on the MISSISSINEWA was the first and only documented sinking of a U.S. Navy ship by a “Kaiten” suicide manned torpedo.

For 57 years the MISSISSINEWA remained undisturbed but never forgotten. Home to many species of coral and marine life and containing just under two million gallons of Navy special fuel oil (NSFO) and marine diesel fuel, it lay upside-down at the bottom of the sea, a war grave for 50 of the 63 sailors who lost their lives.

IN HER SHORT CAREER AT SEA,  
**THE MISSISSINEWA MANAGED TO  
ACCUMULATE FOUR BATTLE STARS FROM ACTIONS**  
SURROUNDING YAP, PELELIU, LEYTE AND OKINAWA.



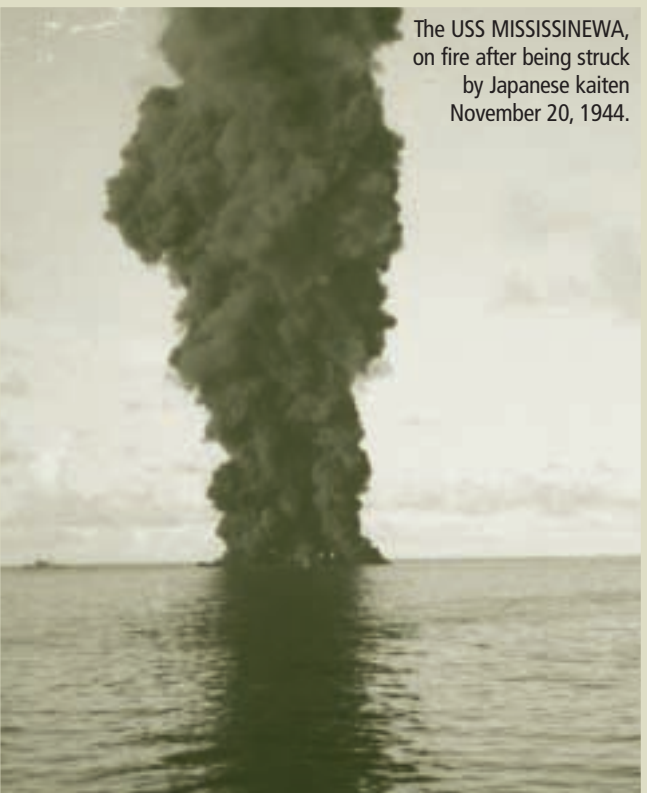
Local U.S. Navy Vessels attempting to put out the fire and smoke engulfing the MISSISSINEWA.



In the final moments of the sinking, a devastated USS MISSISSINEWA overturned, displaying her two screws.



USS MUNSEE extinguishing MISSISSINEWA fires.



The USS MISSISSINEWA, on fire after being struck by Japanese kaiten November 20, 1944.



The charred remains of the USS MISSISSINEWA prior to its sinking.





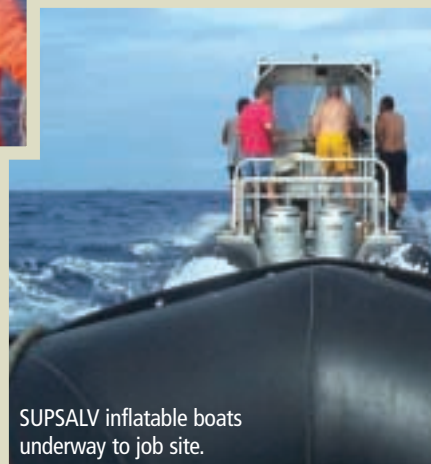
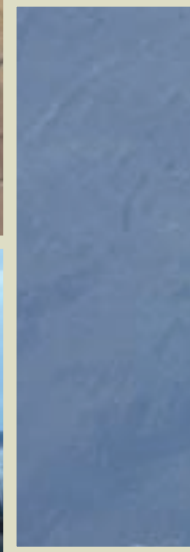
USS Salvor deck crew handling lines while mooring alongside the primary support barge.



Subcontractor deck crew on primary support barge mobilized from Singapore.



Deck crew on subcontracted tug Seacor Rover preparing to deploy one of six mooring anchors.



Zodiac with sorbent boom sweeps recovering minor surface oil sheen.

## INVESTIGATING THE MISSISSINEWA WRECK SITE

In April 2001, a team of independent divers dove on the wreck site 130 feet below the surface in the Ulithi Lagoon and identified the vessel as the wreck of the USS MISSISSINEWA. The wreck, bearing an enormous crater from the explosion, lay in two separate pieces; the bow, resting on its port side, revealed an intact starboard 3-inch gun that through the years had been overwhelmed with coral. Also near the port side, visible hatches and quarters remained permanently open. The stern section of the hull lay totally inverted with the screws visible atop the wreck as they were in the final moments of the sinking. Shortly after this dive, a tropical storm shook the Atoll and oil began leaking from piping in one of the ship's cargo tanks that was open to the sea due to the explosion damage. The oil seeping from the corroded piping and then from this damaged tank was potentially threatening the waters and the more than 700 residents of Ulithi.

In August 2001, as a result of requests from the Yap State Government, the U.S. Department of State, the U.S.

Department of Interior, and the U.S. Coast Guard, the U.S. Navy assembled a team of experts to survey the MISSISSINEWA wreck site to determine the source of the oil and, if possible, stop the release of oil into the lagoon. The Naval Sea Systems Command (NAVSEA) Supervisor of Salvage (SUPSALV) surveyed the vessel and determined whether any discovered leaks could be patched. The leaking piping in number four starboard wing tank was discovered and repaired. However, there was evidence of corrosion around the repaired area, and the potential existed for this area, as well as others, to continue to corrode and potentially release oil in the future. Also at this time, a study conducted by the

U.S. Coast Guard and National Oceanic and Atmospheric Administration (NOAA) showed that the oil released in August had caused only minimal environmental impact on Ulithi.

In December 2001, another leak was reported. SUPSALV, GPC (SUPSALV's environmental response contractor) and the U.S. Navy Mobile Diving and Salvage Unit One (MDSU-1) were sent to the Mississinewa wreck site to investigate and, if possible, stop the leak. Another piping leak attributed to corrosion was discovered in about the same location as the previous leak and was subsequently repaired. The SUPSALV/GPC/MDSU-1 salvage team at this time also conducted a more extensive survey of the wreck.

Although not all MISSISSINEWA's cargo and fuel tanks were checked, the survey revealed that up to 2.8 million

THE STERN SECTION OF THE HULL  
LAY TOTALLY INVERTED  
**WITH THE SCREWS VISIBLE ATOP THE WRECK**  
AS THEY WERE IN THE FINAL MOMENTS OF THE SINKING.





Navy scuba divers surfacing following survey dive.

gallons of oil could remain on board, most of it a thick, sticky product not easily removed from water surface and varying in color from very dark brown to black. The aviation fuel aboard the ship at the time of the sinking was kerosene, but much was either pumped out the afternoon prior to the attack or burned after the Japanese attack, rendering any potential threat benign.

The Government of Yap, recognizing that a serious oil spill would threaten the marine life and the residents, made a request to the U.S. Navy through the Department of State for the removal of the oil. The Navy concurred and began preparing for a more aggressive approach for permanently preventing any future oil releases from the MISSISSINEWA. Given the deteriorating piping, existing hull damage and amount of oil still aboard the ship, there was the possibility of additional oil spills, potentially impacting the 773 people living on the islands who rely nearly entirely on the fishing industry to sustain their economy and way of living.

#### CONSIDERING OPERATIONS FOR DEALING WITH REMAINING OIL

The Navy prepared an Environmental Assessment (EA) that considered a number of options for dealing with the oil on the MISSISSINEWA. The first was a "no action alternative," which consisted of leaving the oil aboard the MISSISSINEWA. Another option



USS MUNSEE (ATF-107).

## SIMON "SID" HARRIS



**S**imon "Sid" Harris was a sailor aboard the USS MUNSEE (ATF-107) the morning of the attack on the USS MISSISSINEWA (AO-59). The MUNSEE, located two miles away, sounded its alarms only minutes after the attack and was the first tug to reach the tanker

through the thick black smoke. Immediately, the crew of the MUNSEE began extinguishing the fires attempting to contain the damage. During the chaos, Harris, using his own camera, was able to snap 37 photos of the smoldering tanker and its final moments. Now in his mid-eighties, Harris is one of few survivors that remain from the MUNSEE. His photos serve as an everlasting reminder of the heroes and valiant efforts to save the MISSISSINEWA.



Sid Harris aboard the USS MUNSEE.



Navy Mk 21 hardhat with helmet-mounted video camera and light—following dive in #4 starboard tank. (Mk 21 is the Mark 21 Mod 1 Underwater Breathing Apparatus diving system.)

was to continue patching the hull and piping as leaks occurred. According to the EA from May 2002, “Once a leak is reported, it takes at least 11 days to mobilize resources to the site, at an estimated cost of \$500,000.” It would be a matter of weeks before the leak could be sealed and a considerable amount of oil might be released in that time; therefore, this option was not pursued. Due to the deteriorating condition of the ship’s hull and exposed fuel piping systems, however, the Navy assessed other alternatives for dealing with the oil remaining onboard the ship to ensure there would be no future releases of oil into the Ulithi lagoon.

Another option contemplated, to ensure no future release of oil, was solidification. This process involves mixing a large amount of solidifier with

the pre-existing large quantity of oil. This option was later considered impractical, not only due to the great volume of solidifier required, and the difficulty of mixing the oil and solidifier in MISSISSINEWA tanks, but also due to the questionable long-term stability of the solidified oil.

A final option considered was total vessel removal. The MISSISSINEWA is one of many sunken ships, including the USS ARIZONA located in Pearl Harbor, which remains an unscathed war grave to the sailors who lost their lives during the attack. Raising the MISSISSINEWA could break up ship compartments where human remains now lie undisturbed. The potential for worse environmental impacts from



Navy diver topside on way to decontamination station and recompression chamber.

raising an unstable wreck in addition to disturbing a war grave made vessel removal an unfeasible alternative.

The Navy ultimately decided to remove the oil from the wreck as it lay at the bottom of the lagoon. Divers would use a series of tools and techniques, including hot tapping into the tanks, to pump the oil onto a barge moored directly above the wreck.

## THE OIL OFFLOAD OPERATION

The Chief of Naval Operations (CNO) assigned SUPSALV the overall responsibility for planning and executing the oil offload operation and directed

THE MISSISSINEWA IS ONE OF  
MANY SUNKEN SHIPS WHICH  
**REMAINS AN UNSCATHED WAR GRAVE**  
TO THE SAILORS WHO LOST THEIR LIVES DURING THE ATTACK.





Navy diver rigging oil discharge hose on MISSISSINEWA's inverted hull.



"Close-out cap" used to secure hot tap hole following oil removal.

Navy divers in Mk 21 surface-supplied air rigs preparing to drill, tap, and bolt hot tap flange to hull.



Navy Mk 21 divers on divers stage preparing to descend from Salvor to MISSISSINEWA.



Navy Mk 21 diver suited out topside on Salvor.



Navy divers preparing to bolt hot tap flange on MISSISSINEWA hull.





One of four 10' x 50' inflatable fenders on primary support barge prior to deployment between nested vessels.



Two hot tap devices on deck—without cutter heads.

A 23' zodiac was used to transfer personnel between vessels as required.



Hot tap and pumping equipment being transferred from the primary support barge to USS Salvor alongside.



Standby oil spill response equipment staged on the aft deck of the Singapore-based tug Seacor Rover.



Explosive Ordnance Disposal Mobile Unit Five (EODMU-5) in Guam were directed to augment SALVOR divers and diving equipment.

SUPSALV provided an On-Scene Salvage Supervisor and again mobilized GPC to assist in the oil offload. GPC mobilized specialized hot tapping, pumping and related support systems from SUPSALV Emergency Ship Salvage Material (ESSM) bases in Williamsburg, Virginia, Hawaii, and Singapore, subcontracted for four support vessels from Singapore, and provided

a Project Manager and skilled oil offloading team. Subcontracted support vessels were a primary support barge, an oil receiving barge, and two barge-towing vessels.

The climate and water conditions in Ulithi, as well as the position of the MISSISSINEWA on the sea floor, were just about perfect for the offloading procedure. Although the divers were prepared to conduct the offload in any weather condition, the operation took place during the tropical storm off-season, dramatically easing the efforts. The state of the wreck offered excellent options for the recovery. The hull's

Commander U.S. Pacific Fleet (COMPACFLT) to provide Navy diver support. COMPACFLT assigned the USS SALVOR (ARS 52) to provide Navy diver support and serve as the On-Scene Commander for the offload. In addition, MDSU-1 in Hawaii and

**DUE TO THE WARM WATER TEMPERATURES, THE OIL WAS NOT AS THICK AS IT WOULD BE UNDER COOLER TEMPERATURES, ELIMINATING ANY NEED TO HEAT THE OIL.**





Shy Uliithi Islander.



Local housing on one of the four inhabited islands surrounding Uliithi Atoll lagoon.



Local island boys.

good condition and inverted position provided divers with easy access to 22 tanks that possibly contained oil. Additionally, the shallow waters made for excellent underwater visibility and extended diver bottom times. Uliithi's mild water temperature was also advantageous to the effort. Often during these types of oil removal operations, the oil needs to first be heated, thinning the oil to ease the pumping process. Due to the warm water temperatures, the oil was not as thick as it would be under cooler temperatures, eliminating any need to heat the oil. Present during the operation was Bill Walker the NAVSEA on-scene salvage supervisor. Walker, extremely pleased with the success of the operation, noted that "because the operation went so smoothly, we were able to retrieve the oil in only four weeks, not the scheduled six."



Local Uliithi Island dancers at MISSISSINEWA Memorial dedication ceremony.





The Commanding Officer of USS Salvor (center) and other crewmembers during MISSISSINEWA Memorial dedication ceremony.



## HOT TAPPING

According to the operations plan, “the MISSISSINEWA offloading concept of operations involves the use of divers to tap into oil cargo and fuel tanks on the inverted hull of MISSISSINEWA and to rig submersible pumps and hoses to allow pumping MISSISSINEWA’s oil to a barge on the surface.” Navy divers descended from the SALVOR and attached hot tap devices to the tank locations on the hull. Small pumps were then positioned over the hot tap as hoses were connected to the barge. The SALVOR, positioned alongside the primary support barge, coordinated diving operations with SUPSALV/GPC pumping operations.

The hot tap operation involved cutting 3.5-inch holes in the hull of the ship at top locations on the tanks, using a rotating cutter device. Once this hole was cut, a valve over the hole was secured and a hose attached to the submerged pump replaces the cutter. The valve was then opened,

and the oil pumped out of the tank. The pumping continued until water was detected.

The hot tapping began with the tanks containing the greatest volume of oil and involved a series of ‘pumping and settling’ cycles to strip the tanks. The oil was pumped from the tanks at a rate of up to 450 gallons per minute. Once water was detected at a sampling port, initial high volume pumping was replaced by a series of alternating settling and low volume “stripping” pump sequences to ensure removal of all accessible oil. After all the accessible oil had been removed, the divers then removed the valves and permanently sealed the access holes.

The diving team installed 20 hot taps along the hull. In addition to accessing oil through the hull plating, they were also able to cut diver access through the hull to two internal tanks: one in the stern section and the other in the separated bow

section, to gain access to more oil. Upon completion of the offload operation, it was estimated that approximately 1.95 million gallons of oil was pumped from 21 tanks, the engine room, pump room and previously leaking piping.

## SAFETY PRECAUTIONS TO PROTECT THE DIVERS AND THE ENVIRONMENT

Important safety precautions were taken to protect both the divers and the environment during the oil offload. Safety briefings were conducted every day to address that day’s procedures. In anticipation of minor oil releases, GPC maintained on-site spill response equipment. GPC also conducted visual surveillance around the area looking for a sheen that might appear consistent with what would appear if oil began leaking to the surface.

AT THE COMPLETION OF THE OFFLOAD,  
**IT WAS ESTIMATED THAT LESS THAN 14,000  
GALLONS OF OIL REMAINED ABOARD THE SHIP  
IN INACCESSIBLE LOCATIONS.**





MISSISSINEWA Memorial plaque with the names of lost Mississinewa crewmembers.

MISSISSINEWA Memorial built by USS Salvor crew.



The Navy's spill response plan included the use of chemical dispersant. Enough chemical dispersant was available to deal with a spill of up to 6,000 gallons, the greatest potential spill anticipated in the EA. The dispersant was to be used only if the oil was outside of containment boom control and if sensitive resources were likely to be impacted. In addition to these measures, all response vessels implemented mooring systems designed to minimize any potential damage to the coral in the areas around the wreck. It is estimated that less than five gallons of oil was released during the offloading, causing no environmental impacts.

Several endangered species exist in the Ulithi area, including two species of sea turtles and three species of marine mammals. Over 1,000 turtles inhabit the region throughout the year. The green sea turtle listed as endangered worldwide, and the hawksbill sea turtle listed as critically endangered worldwide are present throughout the Pacific Ocean area and the Yap State. Although it is thought that sperm whales, pilot whales and bottlenose dolphins are potential dwellers in the Atoll, no extensive research has been done in this region on these species.

## MEMORIAL SERVICE AND SUCCESSFUL MISSISSINEWA OIL OFFLOAD

On February 10, 2003, in the midst of the operation, the crew and residents of Ulithi held a memorial aboard the SALVOR in remembrance of the men who lost their lives aboard the MISSISSINEWA. That following week a permanent memorial was constructed 2 1/2 miles from the wreck on the unoccupied island of Mangejang, serving as an everlasting tribute to the valiant sailors of the USS MISSISSINEWA.

At the completion of the offload, which cost approximately \$4.5M, it was estimated that less than 14,000 gallons of oil remained aboard the ship in inaccessible locations in tanks and in fuel piping systems. The ship currently contains an estimated 7,000 gallons as clingage in the tanks, 6,000 gallons in piping systems and about 1,000 gallons in other inaccessible spaces. Walker said, "I am pleased with the Navy's success in this effort, and confident that all significant volumes of oil have been removed. The MISSISSINEWA no longer poses a threat to the people or environment of Ulithi." The ultimate outcome of the MISSISSINEWA oil offload is the elimination of the threat of future oil releases potentially affecting

the fauna and flora of the surrounding islands, and, more importantly, the livelihood of Ulithi's inhabitants in this vibrant, sparkling Pacific ecosystem. ⚓

*Note: Katie Ladowicz, former intern with the Chief of Naval Operations, Environmental Readiness Division, made significant contributions to this article.*

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# U.S. Navy and Sweden Join Forces

## to Develop "Environmental Considerations"

### Program Manager Handbook Seeks to Reduce Environmental Impacts

The incorporation of environmental considerations into the systems acquisition process is not only a goal of the United States Department of Defense (DoD) but other countries as well. As the Executive Agent for Cooperation between the Swedish Armed Forces and the United States Department of Defense (DoD Project Agreement Number SW-N-96-1503), the Deputy Assistant Secretary of the Navy for the Environment (DASN(E)) with the assistance of the Chief of Naval Operations Environmental Readiness Division (CNO N45) has been leading the effort to work with the Swedish Armed Forces to incorporate environmental considerations into the acquisition process. U.S. and Swedish cooperation was the catalyst that led to the development of Environmental Considerations in the Systems Acquisitions Process—A Handbook for Program Managers.

This Program Manager Handbook was based on the experiences of DoD and Swedish Armed Forces and developed to help weapon system program managers incorporate environmental

considerations into the systems acquisition process.

The Handbook takes a practical approach to the challenges of developing weapon systems that minimize environmental impacts throughout each phase of their life cycle while fulfilling system mission performance requirements. A variety of acquisition approaches are presented along with actual examples of how they were applied to U. S. and Swedish weapon system programs.

Additionally, the Handbook presents an overview of environmental management and planning tools to assist program managers to look forward throughout the system life cycle and consider environmental issues during the design stage. Early prevention or reduction of environmental impacts is the most cost effective way to reduce the environmental compliance burdens during operation, maintenance, and disposal of weapon systems.

The Handbook provides high-level regulatory compliance background and waste stream analysis for ships, aircraft, tactical vehicles and artillery,

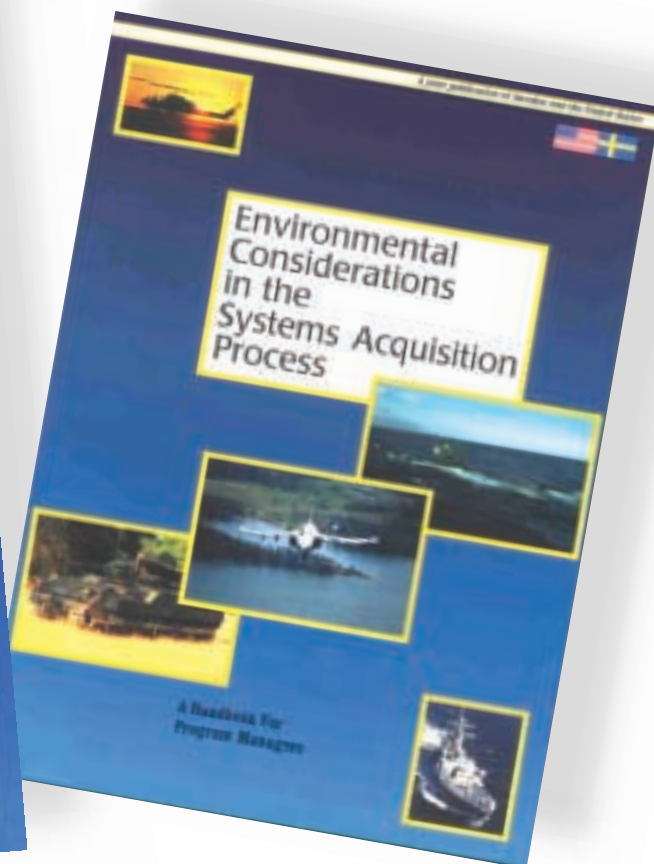
munitions, and electronics. It provides specific broad-based recommendations for program managers to apply in consideration of life-cycle environmental issues for each acquisition phase. The checklists are a good starting point for the program manager to understand where to allocate resources to include environmental considerations during the development of the system with minimal environmental impacts and associated costs.

The Handbook is available at the following web sites:

- Defense Environmental Network & Information eXchange (DENIX)  
<http://www.denix.osd.mil>
- ESOH Special Interest Area on Program Manager Community of Practice (PM CoP)  
<http://pmcop.dau.mil>
- Navy Shipboard Environmental Information Clearinghouse (SEIC)  
<http://navyseic.dt.navy.mil>

On the basis of the experiences gained from the development and international distribution of the Program Managers Handbook, Sweden and the U.S. developed Annex 8 to their Project Agreement. This allowed both countries to build on the success of the Handbook's marketing efforts and expand the reach of the information





provided. Of primary importance is the opportunity to distribute relevant information on incorporating environmental considerations into weapon systems designs to former Soviet bloc nations.

The specific actions that DoD and the Swedish Armed Forces will undertake to complete Annex 8 include:

- Translate the Environmental Considerations in the Systems Acquisitions Process, A Handbook for Program Managers into Russian;
- Distribute the Handbook to former Soviet bloc nations at various international conferences, symposia and websites;
- Define a common list of hazardous materials that can be eliminated or minimized in the development of weapon systems;
- Adapt a life-cycle assessment for application in the material acquisition process; and
- Host a session at the Partners for Peace (PFP) Conference in Tallinn, Estonia 14-18 July 2003, that provides an overview of incorporating environmental, safety, and health considerations into the acquisition process.

The PFP Conference in July signaled the end of the Swedish Armed Forces and DoD's formal cooperation to integrate environmental considerations into the acquisition process. Both countries will continue to work informally as pertinent environmental issues and requirements arise that affect the development of weapon systems in each country and across the globe. ⚓

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## An In-Line

# Oil Filtration System

## FASTT Solution Saves Waste, Labor and Other Costs

**T**he FASTT (Field Activity Support and Technology Transfer) Team, in conjunction with the Portsmouth Naval Shipyard (PNS) in New Hampshire, is transferring to other military installations an in-line oil filtration system that protects the environment while reducing the cost and labor required to perform routine maintenance and repair.

This in-line process is a simple technology that has been used very successfully at PNS for over 15 years. The process involves the in-line filtration of lube and hydraulic oils associated with Industrial Plant Equipment (IPE).

### Background

IPE includes various rotating and hydraulic machinery including lathes, milling machines, press brakes, and shears as well as Computer Numerically Controlled (CNC) shop equipment. There are over 400 different pieces of IPE at PNS with some individual sumps containing as much as 400 gallons of oil.

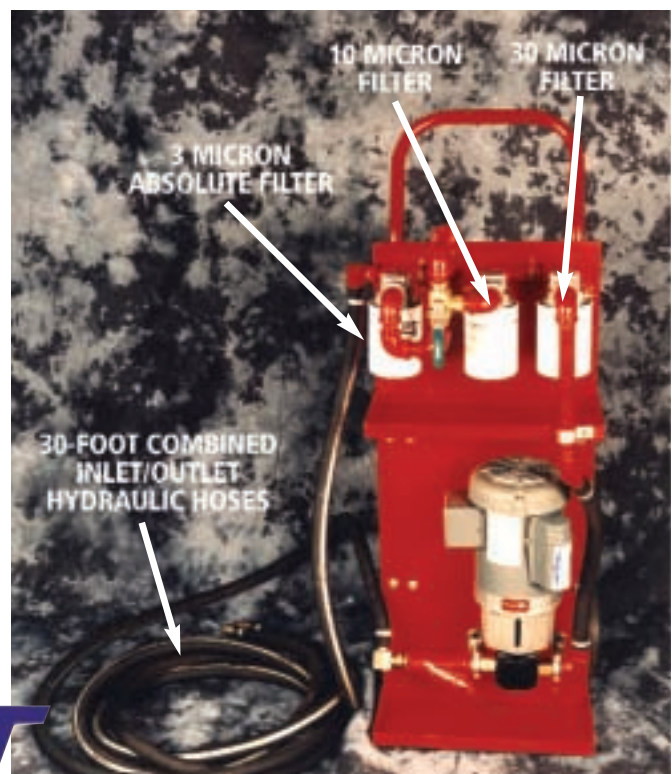
At most bases or depots, IPE oil is changed out on a periodic basis according to the Planned Maintenance System (PMS) schedule. Following the PMS schedule ensures that equipment is properly maintained. But the PMS schedule can also call for the change out of oil when it is not necessary (at times when the oil is still serviceable).

From an environmental point of view, it is desirable to eliminate as much of this oil from the waste stream as possible. It is preferable to purchase less oil from the supply system, thus reducing procurement

costs as well as the health and safety risks associated with the handling and storage of oil. This enhanced process also reduces the burden on maintenance personnel by making the process easier and quicker.

### History

In the late 1980's, the Portsmouth Tool Preventative Maintenance Shop



Features of the in-line oil filtration system.







From an environmental point of view, it is desirable to eliminate as much of this oil from the waste stream as possible.

was reviewing their maintenance costs and expenses associated with their lubrication program. It was evident that there was a large effort required to maintain the current maintenance status on a large number of machines (due primarily to the frequency of oil changes). Additionally, the shipyard was purchasing and disposing of large amounts of costly lubrication and hydraulic oil.

After consultation with the machine tool manufacturers and the oil suppliers, it became evident that the oil in the sumps had minimal contaminants other than wear products (particles from the internal bearings and mating gears/surfaces). There was no source of water/solvent contamination in most of the equipment. The oil did not have any Internal Combustion Engine particulates or acids nor did it get exposed to any high heat source.

The shipyard realized that if the particle count was periodically reduced to a very low level (less than manufacturers' allowances) and some periodic sampling was used to validate the proper oil requirements for the equipment, then oil changes could be extended or eliminated thereby extending the life of the equipment.

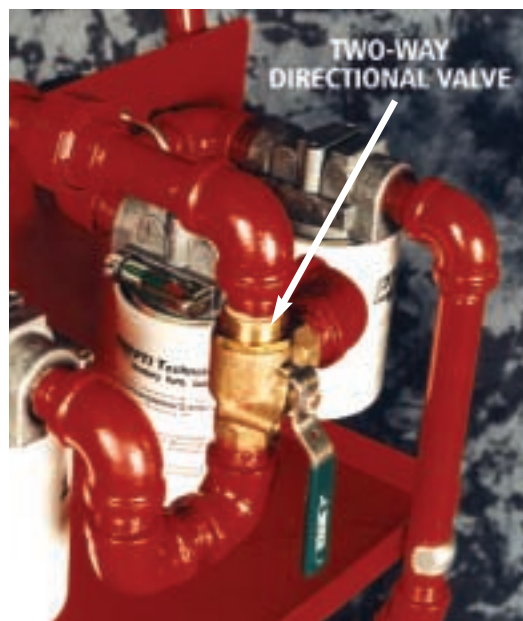
PNS developed a solution to this problem and, along with the FASTT Team, is making it available across the Department of Defense (DoD). From

1986 through 1993, PNS personnel gradually phased in the use of a shipyard-built filtration system with periodic sampling. Oil was filtered based on machine run times. The sampling verified that the filtered oil met all manufacturers' specifications. At the same time, the number of oil types stocked in the shipyard was also reduced. The oils remaining in the supply system were the higher-grade oils that met or exceeded manufacturers specifications.

### In-Line Oil Filtration Program

Over the last ten years, FASTT has observed different equipment maintenance practices at Navy, Army, and Air Force activities and wanted to pursue the most cost effective and environmentally friendly method to accomplishing IPE maintenance.

The FASTT Team gathered program cost information throughout the implementation of the program to evaluate potential savings. Program implementation continued on each piece of IPE after a "one time" thorough draining and cleaning of the sumps, as well as the installation the quick disconnect (QD) fittings and the



refilling of the sumps with a high quality oil.

The filtration equipment was fabricated at the shipyard (at a cost of \$2,500 in FY2002) and was equipped with the QD fittings to mate to the IPE. (These QD fittings help to minimize the labor associated with attaching the filter equipment to the IPE.)



TOP: The discharge hose from the filter system.  
MIDDLE: The suction hose to the filtration system.  
BOTTOM: A frontal view of the oil filtration system in operation.

PNS determined that the use of a few oil types would save costs because personnel would not have to maintain many different types of oil in the supply system. High quality oils were selected and used (as appropriate) in each of the sumps. The additional purchase cost of these high quality oils was prorated over the seven years of program implementation. The savings associated with reducing oil changes and disposal costs of waste oil more than offset the costs of procuring the high quality oil.

FASTT has successfully transferred this system to other industrial activities and instructed personnel on its use. The system has three filters that provide increased filtration (from 25 to 10 to 3 micron absolute filtration). The 3-micron absolute filtration is needed for newer CNC IPE but is not needed on older equipment. The filtration system has a valve allowing the user to bypass the 3-micron filter when it is not needed. The ability to bypass the 3-micron filter helps to extend the life of the filter equipment. The unit also has visual differential pressure indicators to indicate when a filter is expended.

The filtration schedule is established based on the PMS schedule for changing the oil. But instead of taking the IPE out of service and draining and refilling the oil sump, the rolling filtration system is quickly connected to the oil sump to operate. The filtration system does not require a full time operator. Mechanics can work on other tasks

while the filtration system is operating. Oil from the IPE oil sump passes through the filters and is discharged back into the sump. The IPE can remain in service and in use while the oil from the sump is being filtered. The running time is based on the sump size. The process is complete once the volume of oil contained in the sump is processed through the filter ten times. A typical hookup to a press brake at a recent Pearl Harbor Naval Shipyard training session is pictured at left.

### Program Benefits

The FASTT Team has collected some cost and performance data on the implementation of the oil filtration program. The data gathered at PNS for transferring this technology is typical of many industrial activities throughout DoD. Actual data from PNS exemplifies the potential labor and environmental savings.

At the end of the five-year phase-in PNS documented the following savings:

- **Reduced Labor**  
Reduced labor expenditures from \$78.6K per year in 1988 to \$12.9K per year in 1993. This equates to more than \$78K per year savings (in 1993 dollars) and an 80 percent reduction in labor costs.
- **Reduced Oil Purchases**  
Reduced oil purchases from a high of \$14.9K (3,500 gallons) in 1988 to \$3.9K (770 gallons) in 1993. This equated to over \$11K savings per year and a 78 percent reduction in oil costs.

The savings associated with reducing oil changes and disposal costs of waste oil more than offset the costs of procuring the high quality oil.





Bob Vozzella from Portsmouth Naval Shipyard trains Yokosuka maintenance personnel on the use of the in-line oil filtration system at Pearl Harbor.

- **Reduced Waste Oil Disposal Costs**  
Reduced waste oil disposal costs from \$1,750 to \$490 and a 72 percent reduction in disposal costs.

This equates to a greater than 75 percent reduction (over \$90K per year) in all associated labor, oil purchases and disposal. In addition to these reductions, no oil related equipment failures occurred and mechanics are free to complete other tasks while the filtration system is running.

Since 1993, no machine failures have occurred due to oil degradation and the shipyard has been able to maintain the oil in all its 400-plus pieces of IPE. The NAVSEA Inspector General in Fiscal Year 1987 recognized the shipyard for the innovation of this process change. It is still beneficial today.

This change in planned maintenance was done in conjunction with periodic oil sampling, and the standardization of the oil types used for IPE. This means that no oil changes are done unless there is an indication of contamination (wear particles in samples)

or a maintenance shutdown requiring the drainage of the sump.

These changes have resulted in tremendous labor reductions. Oil changes are virtually eliminated. Oil purchases and disposal are reduced over 70 percent.

### A Technology Transfer Success

FASTT has recommended this type of equipment to multiple activities throughout DoD. With the assistance of Phil Hanson, PNS Shop 06, the FASTT Team has manufactured several of these units for other locations. Among the Navy activities that have these in-line oil filtration systems are the Shore Intermediate Maintenance Activity (SIMA) Norfolk, SIMA San Diego, Pearl Harbor Naval Shipyard, and Ship Repair Facility Yokosuka. The FASTT Team has also provided training and guidance in the initial startup of a program. FASTT has received positive feedback from the activities on the continued support provided by PNS and FASTT personnel.



A typical piece of Industrial Plant Equipment.

### Summary

The use of this equipment benefits the environment and reduces labor for maintenance personnel. These savings are more dramatic for those facilities with large numbers of IPE (e.g., repair facilities, shipyards, and depots). The process can be implemented slowly over an entire base, immediately or on specific equipment. The FASTT Team will provide options within their recommendations. Success may not be automatic but the FASTT Team and PNS will work with the activity to meet specific needs and ensure proper implementation thereby reducing risks, protecting the environment and reducing costs. ⚓

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## Navy NoFoam Unit Commercialized

### NFESC Signs Joint Patent License Agreement With Manufacturer

**T**he new NoFoam system used in firefighting equipment testing that was developed by the Naval Facilities Engineering Service Center (NFESC) is now available commercially.

Streamlined technology transfer programs continue to encourage private companies to commercialize technology coming out of the nation's military research centers. JR Thomas International, Inc. of Ventura, California took advantage of the opportunity to license a firefighting equipment test system developed at the nearby NFESC.

Rance Kudo, Jesse McNolty, and Ray Cappillino, members of the NFESC Environmental Quality Division, developed the NoFoam unit, which attaches to fire trucks to replace the foam fluid with a brightly colored surrogate for testing. The green fluid provides visual reassurance and, more importantly, the system monitors the flow rate of the fluid to ensure the correct foam-to-water ratio.

"The solar-powered unit, which can work with any aircraft rescue and firefighting vehicle, mitigates cleanup costs and the cost of foam liquid used in testing. It also builds firefighters' confidence by assuring them the system is working and allowing frequent practice with the equipment," Kudo said.

Tony Thomas, founder of JR Thomas, produces the trailers and the fittings that connect the trucks to the NoFoam test system. Thomas had worked many times with NFESC and appreciated the commercial applications for the NoFoam unit.

Airports like Los Angeles International use the same foam. Some airports have spent millions of dollars on test cleanup facilities.

JR Thomas will manufacture the units and begin marketing to U.S. and Canadian commercial airports.

By mid-February, when Thomas and Captain Richard O. Gamble, Commanding Officer of the NFESC, signed the joint patent license agreement, NoFoam units had been tested on about 75 firefighting vehicles in different branches of the Department of Defense. "Every single vehicle tested had problems," Kudo said. "Many people were not putting enough foam—or surrogate—into the mix."

"Our job is demonstration and validation—  
where the rubber meets the road."



Kurt Buehler, Office of Research and Technology Application (ORTA) shakes hands with Tony Thomas of Thomas International, Inc. after signing NoFoam license with the Naval Facilities Engineering Service Center.



Naval engineers Rance Kudo and Ray Cappillino (BACK) are working with Tony Thomas and Captain Richard Gamble (FRONT) on manufacturing and marketing a unit that will allow firefighters to test their equipment in a more environmentally friendly way.



According to the licensing agreement, Thomas paid \$2,000 at the outset and will pay per-unit royalties, which go back to the inventors and NFESC.

Kurt Buehler, the Far West Regional Coordinator with the Federal Laboratory Consortium for Technology Transfer, admits, "Every time you deal with the government, there is bound to be some bureaucracy involved." The technology transfer law applies not only to classic laboratories like Lawrence Livermore National Laboratory, but every Navy base, including NFESC, which provides specialized facilities engineering support to the Navy. NFESC has shifted away from more theoretical research and development to more practical problem solving, making its work more commercial-ready. "There's a lot of potential here," Buehler said. "Our job is demonstration and validation, where the rubber meets the road."

NFESC focuses on specialized facilities engineering in five primary areas: ocean facilities, shore facilities, environmental engineering, energy and utilities, and amphibious and expeditionary for construction; maintenance; and war-damage, and restoration of bases. ⚓

*A longer version of this article was first published in the Pacific Coast Business Times ([www.pacbiztimes.com](http://www.pacbiztimes.com)). Used here by permission.*

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*If you would like to share your pollution prevention success stories, or would like additional information on the Navy's technology transfer program, contact Kurt Buehler.*

# GEM-Dandy

## Spry Little Vehicle Contributes to Cleaner Air While It Zips Around China Lake

**N**o, it's not coin-operated; no, it doesn't have an extension cord; and, no, a dozen clowns won't burst out when it stops.

But this snazzy little car has still managed to make folks who are concerned with clean air happy.

Naval Air Weapons Station (NAWS) China Lake received ten Global Electric Motorcars (GEMs) recently,

courtesy of DaimlerChrysler, as part of the State of California's new requirement that automobile manufacturers sell a percentage of alternative fuel vehicles. In addition, Executive Order 13149, signed by former President Clinton in April 2000, mandates that 75 percent of new vehicles purchased by the government be alternative fuel vehicles. The ten new vehicles bring the total up to 27 GEMs at NAWS China Lake. In California, the inex-

pensive, quiet cars are certified as zero emission vehicles.

The GEM is a purely electric vehicle that can travel 35 miles on a single six-to eight-hour charge from a 110-volt outlet. Although they look like golf carts, the vehicles are equipped with front-wheel drive, four-wheel hydraulic brakes, rack and pinion steering, an automotive safety glass windshield, turn signals, mirrors, wiper blades, head- and taillights and three-point anchored seatbelts. Hard doors, soft doors and heaters may be added. In addition, with a top speed of 25 miles per hour, the vehicles can legally drive

Two employees at Naval Air Weapons Station (NAWS) China Lake use the long-back model of the Global Electric Motorcar (GEM) to transport computer parts around the base. These all-electric vehicles contribute significantly to NAWS China Lake's and California's clean air.





All-electric Global Electric Motorcars (GEMs), like this one, help contribute to the clean air of Naval Air Weapons Station (NAWS) China Lake and California. NAWS China Lake has 27 GEMs.

on roads whose speed limit is posted as 35 miles per hour or slower.

Luke Air Force Base (AFB) in Goodyear, Arizona, which uses 144 GEMs among its 430 electric vehicles, conducted a study using figures from 1998. Luke AFB's Trip Reduction Program study found that, with each electric vehicle running an average of 1,300 miles per year, it avoided expelling 9.5 tons of pollution per year that would have otherwise been released through driving gasoline-



"Anytime you replace diesel or gas with electric, it's going to benefit clean air."

powered vehicles, and also avoided expelling five tons of pollution per year just by eliminating cold starts.

At NAWS China Lake, the GEMs have been assigned as "B-pool," or permanent, vehicles and serve two basic functions: moving people quickly around the base and hauling small loads, such as parts and supplies.

Of the latter task, CAPT Randy Jackson, Public Works Officer at NAWS China Lake, said, "We find this use to be extremely handy."

GEMs are produced at the Fargo, North Dakota facilities of Global Electric MotorCars LLC, a subsidiary of DaimlerChrysler. Four models are available: two- and four-passenger

cars, and short-and long-bed utility vehicles. The first GEM was produced in April 1998.

In addition to a good rate of acceleration and nimble handling, the GEMs are easy to operate and recharge. And, yes, it has been reported that the vehicles are fun to drive.

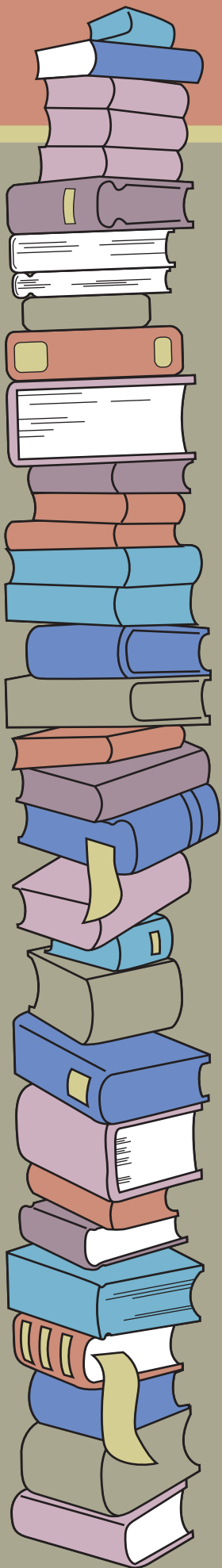
"All in all, I prefer to use my GEM over my Jeep when traveling around mainside," Jackson said.

In an effort to further save energy, the Public Works and Energy Program offices may use photovoltaic, or solar power, cells to charge the GEMs. This would make recharging the cars "free" and also reduce conventional energy requirements for operating them.

"Anytime you replace diesel or gas with electric, it's going to benefit clean air," said Rich Varenchik, deputy communications director with the California Air Resources Board. "That's certainly something the Navy is to be commended for." ⚓

## CONTACT

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# On COURSE... of COURSE!

Navy Schoolhouses Use  
Technology, Coordination,  
Feedback to Deliver  
Effective Environmental  
Training Worldwide



Moreell Hall, CECOS training building, located at Port Hueneme Naval Base Ventura County in California.



The Civil Engineering Corps Officer's School (CECOS), located at Port Hueneme Naval Base Ventura County in California, has been a training center for the Navy since the early days of World War II—under the direction of the Chief of Naval Operations (CNO) and the Naval Education and Training Command (NETC). CECOS works with the Naval Occupational Safety and Health and Environmental Training Center (NAVOSHENVTRACEN) in Virginia, offering vital environmental training to Department of Defense (DoD) military and civilian personnel.

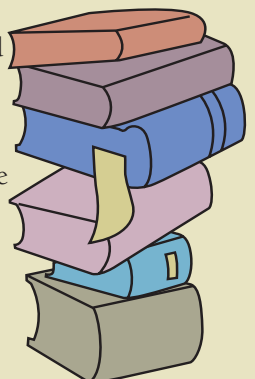
CECOS and NAVOSHENTRACEN work together to offer environmental training in four concentration areas: Pollution Prevention, Compliance, Restoration and Conservation. CECOS

handles ashore environmental training and NAVOSHENTRACEN focuses on afloat safety procedures and training. The training offered at many fleet locations throughout the year (including Norfolk, Honolulu, Guantanamo Bay, Yokosuka and others) is available at no tuition charge.

Through the Interservice Training Review Organization (ITRO), the Navy, Marine Corps, United States Coast Guard, Army, Air Force and Defense Logistics Agency work together to train military and civilian personnel. By combining many classes with those of other branches, the school is able to create a universal offering, such as the required Air Quality class implemented by the Air Force. The Navy needed to create a similar class and, in an effort to save a

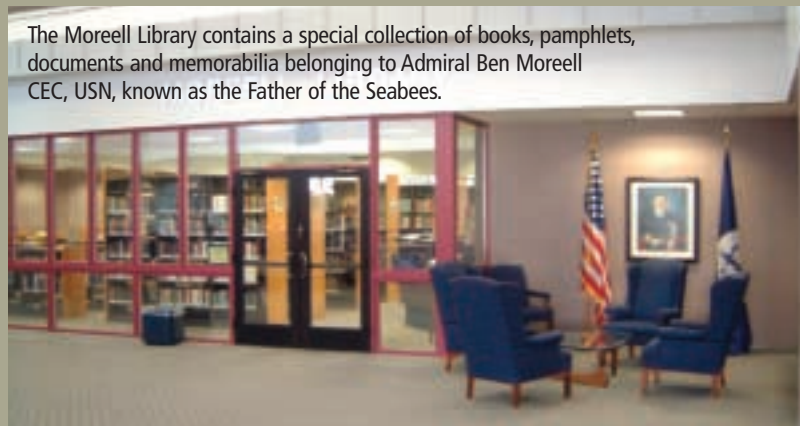
great deal of money, joined forces with the Air Force.

Many of the Navy's environmental courses coincide with those of the other DoD branches. ITRO therefore established the Interservice Environmental Education Review Board (ISEERB) to act as an advisory board to the ITRO. The ISEERB provides the most cost effective and efficient environmental education and training courses by approving education and training that component subject matter experts have found to have common content suitable for two or more components. The purpose of ISEERB approval is to eliminate duplication in





Soil sampling exercise in the Environmental Quality Sampling course (8 May 2001).



The Moreell Library contains a special collection of books, pamphlets, documents and memorabilia belonging to Admiral Ben Moreell CEC, USN, known as the Father of the Seabees.



Field decontamination in the Environmental Quality Sampling course (May 2001).

course development by the components and maximize the distribution of quality environmental training needs.

The CECOS Environmental Division has eight civilian instructors and two contracted instructors. The contractors conduct only restoration courses while the civilian instructors cover the four environmental training concentration areas, as well as Environmental Law and Planning. The Environmental and Natural Resources Program (ENRP) Navy Training Steering Committee determines the environmental courses and training for the Navy. This committee works with the afloat and ashore working groups to determine the best approach to suit the Navy's environmental training needs.

Courses are one to five days long, depending on content and whether or not there is an associated laboratory exercise. Course size also varies. Classes tend to be relatively small (at around 30 people) creating a good student-to-teacher ratio.

Various courses are covered under the four concentration areas of environmental training. One class covered under Pollution Prevention is "Pollution Prevention Program Operations and Management." Compliance courses offer training for dealing with concerns such as spills, asbestos and hazardous waste management. The Hazardous Waste Operation and Emergency Response (HAZWOPER) course is one of the

major courses offered under Restoration. Restoration deals with the assessment and analysis of environmental and human health risks that are of concern at cleanup sites. Training offered under Conservation deals with many of the cultural and natural resources, laws, regulations and policies personnel will encounter. For a complete list of courses go to <https://www.cecocos.navy.mil>.

"We train military and civilian, both environmental professionals and wage grade. We also train Interservice students through ISEERB. In Fiscal Year (FY) 2002, 3,350 students were trained





# REGISTER NOW for Environmental Training Courses

## COURSE: ADVANCED ENVIRONMENTAL LAW

**Offered By:** CECOS

### **Dates & Locations:**

2–6 February 2004 . . . . . Washington, DC  
*Advanced Environmental Law featuring environmental planning.*

29–30 July 2004 . . . . . Norfolk, VA  
*International Environmental Law—a special synthesis of the laws and policies guiding operations or bases and facilities abroad.*

13–14 September 2004 . . . . . Honolulu, HI  
*Ocean Resources Law—application of all Federal environmental laws and policies applicable to natural resources found in oceans and coastal environments. Special focus on operations, training, test and evaluation and natural resources management.*

**Description:** This five-day course includes advanced environmental law and policy presentations that provide Department of Defense (DoD) environmental professionals with important new information in their area of expertise. The course can be up to five days in length depending upon new and emergent issues that need to be addressed that year. Topics to be explored in August 2003 include a law and policy update and ashore environmental law topics.

**Special Mini-Course:** Advanced Environmental Planning Law featuring cumulative effects analysis, data collection and discussion, environmental planning abroad, protected resources protection and analysis, coastal planning law, integrated natural resources management planning, surviving headquarters review, use of contractors guidance, litigation under the Administrative Procedure Act (APA), and the use of the categorical exclusion.

Following the two-day Advanced Environmental Planning Law course, there will be a special three-day Advanced Planning Workshop sponsored by the Chief of Naval Operations Environmental Readiness Division featuring the writing and reviewing environmental planning documents and interdisciplinary teams. Senior DoD attorneys and environmental professionals teach the course.

**Target Audience:** Experienced environmental planners, managers, engineers, attorneys and specialists who require an in-depth understanding of law, policy and management within their area of environmental expertise. This course is open to all Department of Defense Services, United States Coast Guard and Defense Logistics Agency personnel on a seat-available basis. Other Federal Agency personnel may also attend.

**Contact:** Melanie Ravan, CECOS  
805-982-1691, DSN: 551-1691, RavanMD@cecos.navy.mil

## COURSE: HAZARDOUS SUBSTANCE INCIDENT RESPONSE MANAGEMENT (HSIRM)

**Offered By:** NAVOSHENVTRACEN

### **Dates & Locations:**

3–7 November 2003 . . . . . Guantanamo Bay, Cuba

17–21 November 2003 . . . . . Newport, RI

1–5 December 2003 . . . . . Everett, WA

8–12 December 2003 . . . . . Bremerton, WA

12–16 January 2004 . . . . . Pearl Harbor, HI

12–16 January 2004 . . . . . Chinhae, Korea

26–30 January 2004 . . . . . London, UK

2–6 February 2004 . . . . . Mayport, FL

2–6 February 2004 . . . . . Singapore

9–13 February 2004 . . . . . Diego Garcia

23–27 February 2004 . . . . . San Diego, CA

**Description:** This five-day course provides personnel with the knowledge and skills necessary to respond safely and effectively to releases of, or substantial threats of releases of, hazardous substances, in compliance with applicable federal, state, and U.S. Navy environmental regulations and instructions. This course fulfills the training requirements established by regulations delineated in 29 CFR 1910.120 (q) Emergency response to hazardous substance releases, and 29 CFR 1910.120 (p) (7) (i) Operations conducted at a Treatment Storage and Disposal (TSD) facility. The Resource Conservation and Recovery Act (RCRA) program manager or their designated person will provide TSD site-specific training. This also fulfills the training requirements in OPNAVINST 5090.1 (series), and OPNAVINST 5100.23 (series).

**Target Audience:** Civilian and military personnel ashore who may serve as activity Emergency Response personnel, as well as the following: Fire and Police Department personnel; Environmental Engineers, Specialists, and Technicians; Environmental Managers and Supervisors; OSH personnel; Waste Handlers and Treatment, Storage and Disposal Facility (TSDF) personnel; Hazardous Materials Minimization Center (HAZMINCEN) personnel; Warehousemen and Laboratory personnel. Shipboard personnel will be granted quotas, space available, upon verification of membership on the shipboard spill response team. All personnel must have at least 12 months from course date remaining in job assignment.

**Note:** The Environmental and Natural Resources Program Navy Training System Plan (NTSP) Steering Committee has officially approved to reduce this course from 40 hours to 24 hours starting in May 2004.

**Contact:** Duane Gielda, NAVOSHENVTRACEN  
757-445-8778, DSN: 565-8778, Duane.Gielda@cnet.navy.mil



LEFT TO RIGHT:

Groundwater sampling exercise in the Environmental Quality Sampling course (January 2001).

Robert Darley, NAVSEA Programs Field Office (SEA 04XQ/LABS), Instructor of Environmental Quality Sampling course demonstrating potable water sampling.

PH meter being used during potable water sampling exercise in the Environmental Quality Sampling course (January 2001).

Potable water sampling exercise in the Environmental Quality Sampling course (January 2001).

Surface water sampling exercise at the Environmental Quality Sampling course (January 2001).

through 36 environmental courses. Over 200 students were from other services," said Barry Hickenbottom, Deputy Director of CECOS Environmental Training. Hickenbottom is very confident about Navy's successes. "In a lot of ways, we've grown a whole lot in ten years."

CECOS was established during World War II in Williamsburg, Virginia at what was then the original Seabee Training Center. The school moved for a brief time to Davisville, Rhode Island, and in 1947 settled in at Naval Base Ventura County in Port Hueneme, California. Until 1991, the school functioned out of old World War II barracks. Currently, CECOS operates out of a 68,000 square foot state-of-the-art training facility.

In 1974, CECOS began its environmental training program with just one course. By 1984, there were seven. In 1992, NETC released a document identifying over 60 environ-

mental courses they thought Navy personnel needed. The Navy did not have the money to support 60 courses and the plan was revised. Navy environmental training has grown from eight courses offered in the mid 1990's to 42 courses with 175 offer-

ings now. CECOS directors run 36 of the courses while the others are offered through other services.

The courses adjust to new issues, laws and regulations. CECOS has changed an Environmental Law course to address issues pertaining to encroachment and ranges. Within the past two years, CECOS added an Environmental Law 'mini-course' that addresses current issues in the field. According to Hickenbottom, "In FY 2001 we addressed Ocean and Natural Resource Law. In FY 2002 we addressed Coastal Resources Law. In FY 2003 we will address Environmental Planning." Restoration is the most rapidly changing area of environmental training, and adjustments to courses need to be made more often than in other areas. In addition to adjusting the course schedule, CECOS is making it easier for students to register by being one of the first schoolhouses in the Navy to offer online registration.

Although the CECOS command center is in Port Hueneme, few courses are actually taught there. Instead it serves as home to the directors and designers who develop the courses. Due to demand for environmental training and the locations of personnel, training is sent out to fleet concentrations around the world. Over 95 percent of

CECOS training occurs at locations other than Port Hueneme. "Our training can only be as good as the training requirements identified," Hickenbottom said. "This includes that the students need to do the job and how many quotas are needed in a particular location. Saving travel dollars for commands is one of our goals. But with limited training funds, CECOS must select the areas that support the training of the most students." Coast to coast, afloat and ashore, CECOS has the potential to reach Navy military and civilian personnel in need of environmental training.

Navy environmental training has changed as the Navy has changed. Several years ago, in an effort to reach as many personnel as possible, the Navy began developing interactive multimedia instruction (IMI) and satellite courses. Presently there are 18 different computer-based training products that are used by environmental professionals. "Not all training is applicable to this technology, but it is one way to get training out to the masses," Hickenbottom said. "The use of web-based training will increase in the next few years."

Advantages of the IMI's are they can be used both afloat and ashore, which is a great convenience to students. Many students taking the courses need a





one-day refresher for a specific subject in their area, not an entire three-day training session.

For example, CECOS has developed a Hazardous Waste Disposal course for painters specified to the disposal of paint, rags and containers, and how to properly wash off brushes. Through the online course, the painter receives all of the necessary information about disposal, and doesn't waste time and money traveling to attend a class not required for his or her job. CECOS has similar refresher disposal training available for batteries, oils and oily rags.

CECOS is in the process of building a series of computer-based awareness tools. Just last year, CECOS developed training materials to address issues pertaining to Bird Aircraft Strike Hazards (BASH). The BASH course covers the hazards associated with bird strikes and is geared toward government employees, Naval aviators and support staff. All Hands Environmental Awareness is

another awareness tool developed to inform new employees of the environmental aspects of activities. Another awareness series has been developed in the pollution prevention area. A complete list is available at <https://www.cecoss.navy.mil>.

Currently, HAZWOPER is the only 100-percent web-based course available through CECOS. Hickenbottom said, "I see CECOS doing a lot more Internet- and computer-based training. Travel dollars are getting harder to find so we are going to find new ways to train our students."

Another technology the Navy is utilizing is satellite-training courses. Some of the course offerings may not receive very strong responses from the field, and therefore only a few quotas are filled. For these instances, the Navy is attempting to utilize satellite capabilities of the Air Force to send out a signal from NAVOSHENVTRACEN, the CECOS sister



Jordan Adelson, Perot Systems Government Services, instructor in the Environmental Quality Sampling course.



Simulated hazardous waste sampling in the Environmental Quality Sampling course.

## HOW TO REGISTER for Environmental Training

### FOR CECOS

If you would like to register for a CECOS course, you can do so by filling out the application in the back of the catalog and faxing it to the following number:

**Naval School, Civil Engineer Corps Officers School**  
**Commercial Fax:** 805-982-2918  
**DSN Fax:** 551-2918

You can also view the CECOS catalog at <https://www.cecoss.navy.mil>, and register for a CECOS course by filling out a quota request and submitting it online.

To receive CECOS materials, go to <http://www.tecquest.net>.

### FOR NAVOSHENVTRACEN

Visit <http://www.norva.navy.mil/navosh>.

### FOR COURSES OFFERED THROUGH OTHER BRANCHES

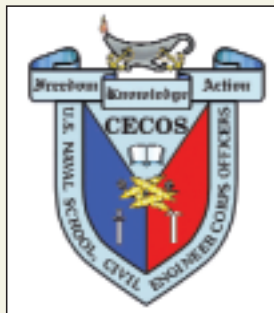
Access the following websites, fill out a quota request and send it to the specified location.

**U.S Army Corps of Engineers:**  
<http://pdsc.usace.army.mil>

**Defense Logistics Agency:**  
<http://www.hr.dla.mil>

**Air Force Institute of Technology:**  
<http://cess.afit.edu>

**Navy Supply School:**  
<http://nscs.cnet.navy.mil/training.asp>



# Coast to coast, afloat and ashore, CECOS has the potential to reach Navy military and civilian personnel in need of environmental training.

school, to Air Force base classrooms with the proper capabilities. This way several groups of students in different locations are given the proper training by a live instructor. CECOS recognizes the need for students to fulfill all training necessary to their jobs and is reaching out to them with all possible means.

While CECOS is responsible for ashore training, its counterpart, NAVOSHENVTRACEN, handles environmental and safety training necessary aboard ships. NAVOSHENVTRACEN was originally established as the Naval Sea Systems Command (NAVSEA) Safety School in Bloomington, Indiana in 1967. There it functioned as the Navy's source of weapons and explosives safety training for the Naval Weapons Support Center in Crane, Indiana. Since then, the school has evolved with bicoastal facilities in Norfolk, Virginia and San Diego, California. The school expanded its mission in 1994 to include shore and afloat occupational safety and health, hazardous material control and management, and afloat environmental protection training.

NAVOSHENVTRACEN focuses on responding to oil spills. Currently there are seven environmental courses with 182 offerings, an increase from 150 in FY 2002. These courses include:

- Afloat Environmental Protection Coordinator (AEPC),
- Hazardous Substance Incident Response Management (HSIRM),
- Facility Response Team, Spill Management Team (SMT), and
- Regional Oil and Hazardous Substance Team training.

Through these offerings, NAVOSHENVTRACEN trained 2,058 civilian and military personnel that were assigned to facilities' response plans or emergency response teams worldwide, including forward deployed areas.

"The training allows the Navy to clean up and protect the environment at the same time," said Commander Don

Hagen, Director of NAVOSH ENVTRACEN. The center is currently evolving from a reactive to a prevention mode with the development of an oil spill prevention course- They are also working on computer-based training (CBT) for ships that will be both class- and ship- specific.

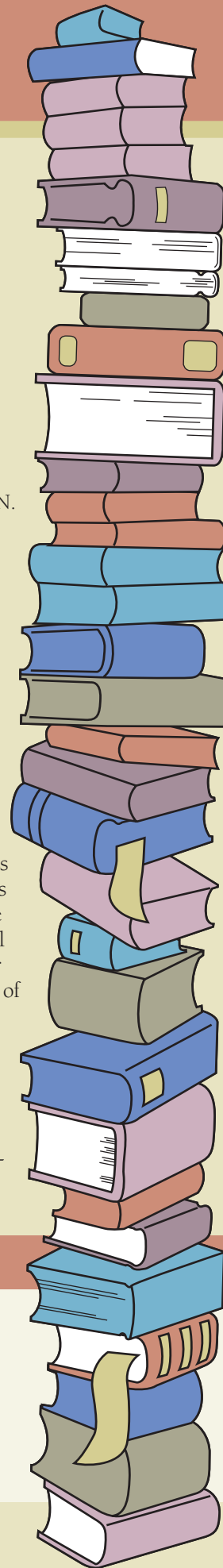
NAVOSHENVTRACEN offers an Afloat Environmental Protection Coordinator (AEPC) training CD for deployed ships and is also in the process of testing its satellite capabilities.

These two training schools continue to enhance the Navy's environmental awareness and ability to meet compliance requirements by offering up-to-date environmental course material that is directly relevant to personnel afloat and ashore. "We constantly adjust our classes to the needs of the environment and of the fleets," said Hagen. "This leads to better training and more tangible, positive results for Navy personnel." ⚓

*Note: Katie Ladowicz, former intern with the Chief of Naval Operations, Environmental Readiness Division, made significant contributions to this article.*

## CONTACT

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## 2004 Currents Calendars *coming soon!*

### Natural Resources Grace Pages of This Year's Calendar

The 2004 Currents calendar provides a glimpse at some of the plants and animals that live on U.S. Naval facilities and notes the Navy's stewardship efforts. See the array of birds, plants, fish and coral that make our facilities home. Learn a little about their habitat and why the Navy's efforts are so important to supporting biodiversity. The calendar also will keep you informed about the dates of many Navy environmental activities, anniversaries of major environmental legislation and official federal holidays.

If you subscribe to Currents, you will automatically receive your 2004 calendar by the end of this year. If you don't receive it, or need an extra copy or two, contact Jim Ganci at [GanciJS@navair.navy.mil](mailto:GanciJS@navair.navy.mil) or 904-542-0516, x-101. He'll make sure you get one.

coming soon

# Checking for Leaks

## Helium Is the Safe Alternative to Freon

Personnel from the Naval Air Depot (NADEP) Jacksonville Materials Engineering Laboratory are adopting a helium-based system for fuel tank system leaks as a safer, less expensive and environmentally friendly alternative to the traditional Freon-based system.

common to inject a small amount of Freon-113 into the wing section and then pressurize the wing. A halogen leak detector was then used to inspect the outside of the wing to determine leak locations.

However, since Freon-113 was made unavailable and no similar substitute performed as well as Freon, attempts were made to come up with acceptable alternatives. One procedure used air to pressurize the wing section and then spray on a soap solution to see if the soap bubbled anywhere on the wing – not a particularly effective or reliable method for detecting leaks.

The detector gives the operator a visual and audible alarm when a leak is found.

### Background

Like many aviation depots, the Naval Air Depot (NADEP) at Jacksonville regularly checks integral fuel tank systems for leaks. When Freon-113 was available, it was

Jeff Tapley and Lee Pearl went to NADEP Jacksonville's Materials Engineering Laboratory during the summer of 2002. Both Jeff and Lee worked in the NADEP's wing shop and complained to the Laboratory's scientists that the "soap method" just did not work very well. As it happens, leaks are often located in areas where the soap solution is difficult to spray. Even if the soap solution is sprayed into such an area, one may not even be able to determine if a leak is present—if bubbles appear on the sprayed area. (These areas are known as "blind" areas.) What the wing shop needed was a method that worked as well as the Freon-113-based method and incorporated an environmentally acceptable solvent or gas.



The small size of the portable helium leak detector makes it easy to carry.





The portable helium leak detector is used for examining blind areas in the wing section.

### A Helium-Based System

Such a system is now available. The new system is a portable leak detection unit that uses helium as the detection gas. The process is very similar to the old Freon-113 method. But instead of using Freon-113, the system employs helium. Helium from a compressed gas bottle is introduced into the wing section. The wing is then pressurized with compressed air. Now, instead of using a halogen leak detector to determine the location of the leak, one can use the helium leak detector.

One weekend, about five different artisans spent about two working days trying to find a leak in one EA-6B wing section. The same leak probably would have been found in a couple of hours or even minutes if the portable helium leak detection unit had been available.

Jacksonville's wing shop now has the ability to check for leaks more efficiently and in an environmentally and occupationally safe manner.

### Potential for Additional Applications

In addition, this leak system has an expanded application for checking leaks in large systems such as P-3 wings. AEROWING has developed equipment and accessories that allow the leaks to be located on the outside of the wing but also can check for the origin of the leak on the inside of the fuel tank. Personnel from NADEP Jacksonville hope to prototype this system for outside leak detection in the fall of 2003.

Helium is inexpensive, non-explosive,  
non-reactive, and environmentally safe.

The detection unit is portable and employs a handheld probe with attachments. As one scans the surface, the detector gives the operator a visual and audible alarm when a leak is found.

Helium is inexpensive, non-explosive, non-reactive, and environmentally safe. Using this leak detection method, a standard size commercial helium bottle will probably last for a couple of years.

Last year, the manufacturer of this portable system, AEROWING Company of Miami, Florida, demonstrated the unit for Jacksonville's wing shop on an F/A-18 wing section. The demonstration was very successful. Many blind areas were located as well as other leaks. The unit was so popular that NADEP Jacksonville purchased a basic unit. In January 2003, the manufacturer trained several artisans in the wing shop.

The entire system is affordable, durable, and portable and can be used in a squadron where repairs must be done in a timely manner without the complications associated with bulky or delicate equipment. ⚓

## CONTACT

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# Going Batty

## in Ventura

### Acoustic Recordings and New Condos Track and Settle Bat Population

**N**aval Base Ventura County (NBVC), Point Mugu, California is making possible the co-existence of bats and Navy personnel by identify the buildings currently occupied by bats, assessing the seasonality of bat movement, inventorying the bat species and relocating bats to newly constructed “bat condos” on the base.

For many years, the buildings at NBVC have sheltered Mexican (a.k.a Brazilian) free-tailed bats (*Tadarida*

*brasiliensis*). These are the “fighter jets” of the bat world, capable of reaching speeds of 40 miles per hour (mph), migrating over a thousand miles and flying up to 10,000 feet above the ground. Mexican free-tailed bats forage over large areas each night, ranging as far as 25 miles from their roosts. They roost in crevices in cliff faces or manmade structures such as bridges and buildings. Therefore, because of their propensity to roost in proximity to man, Navy personnel at NBVC Point Mugu are faced with the challenge of co-

existing with bats entering their work areas. The older buildings at Point Mugu support extensive bat roosts, and bat exclusion is an ongoing maintenance chore. Without tearing down buildings, or major renovation, the exclusion of all bats on the base is unrealistic. In fact, bats play a valuable role in the biological control of mosquitoes and other pest insects. Therefore, it has become necessary to establish a balance between the positive and negative contributions of the Point Mugu bats.

#### A Bat Management Plan

A comprehensive bat management plan was recently completed to identify the buildings currently occupied

These are the “fighter jets” of the bat world, capable of reaching speeds of 40 mph, migrating over a thousand miles and flying up to 10,000 feet above the ground.



Mexican free-tailed bat.



# Echolocation signals recorded via an ultrasonic detector on laptop computers and/or storage modules were used for identification of bat species and to document general bat activity.

by bats and assess the seasonality of bat movement throughout the base. A secondary objective of the study was to inventory the bat species at Point Mugu. The management goal is to facilitate the co-existence of bats and Navy personnel on base.

The year-long study involved observing those buildings with documented bat activity, such as fresh guano (bat droppings) or complaints filed with the Public Works department. Bat activity in suspect buildings was verified through visual observations of bat emergence, mist netting, and acoustic recordings. This enabled identification of roost locations, approximation of population size, and identification of species, sex, and reproductive condition.

## Acoustic Recordings Using Ultrasonic Detectors

Since the capture of bats was not feasible in most cases, acoustic recordings using ultrasonic detectors and associated analysis systems were the principal method for species identification. Echolocation signals recorded via an ultrasonic detector on laptop computers and/or storage modules were used for identification of bat species and to document general bat activity. Species identification is made

possible by comparing the acoustic recordings with “voucher” calls from known bats. There is some error margin. The most definitive calls for a species are “search phase” calls, characteristic of bats foraging, and these might be different from hand-released bat voucher calls. Different bat species can at times use similar signals, and the same species can employ a variety of sounds based on the perceptual task and the surrounding habitat. A knowledge of which bats are common to the area, as well as bats that may be present but uncommon, is essential to the acoustic identification process. All bat species identified acoustically during this study are known to occur in the Los Angeles or Ventura Counties.

Several factors influence the recording of acoustic data. The position of the bat relative to the detector and the intensity of the bat’s call have a profound affect on whether or not the acoustic system will record the sound. Moisture in the air affects the detectability of a signal. At times, certain bats will orient visually and emit no echolocation calls at all. Pallid bats (*Antrozous pallidus*) see very well in moonlight and may not bother to echolocate, although their distinctive communication signals can indicate their presence. Mexican free-tailed bats (*Tadarida brasiliensis*)



Seabees raising and welding various bat houses.

## The larger “bat condo” will be installed on top of one of the warehouses close to an existing Mexican free-tailed bat colony.



Bat house number 9.

and western mastiff bats (*Eumops perotis*) emit such loud, low frequency calls that they can be recorded from hundreds of feet away, whereas Townsend's big-eared bats (*Corynorhinus townsendii*) emit such faint calls that they are seldom detected from over ten feet away. Often the signals of *Eumops* are not recorded because the frequencies are too low for the microphone to capture. Their calls are audible to most people with good hearing, and the bats may be heard long before being recorded with an ultrasonic detector.

Placement of the ultrasonic detector can have a significant effect on the number of calls recorded. The quantity of calls does not usually equate to the number of bats. Acoustic bat activity near a roost or in an active foraging area is often continuous throughout the night because an individual bat

spends considerable time calling in the same general area. Recording along a commuting route between the roost and the foraging area may result in a single call sequence per bat and result in fewer calls but represent more bats. Therefore, several points need to be considered when interpreting the acoustic data: (1) some calls will be misidentified; (2) the louder bats will be over-represented; (3) “whispering” bats such as *Corynorhinus townsendii* may not be recorded; and (4) the number of calls recorded is an index of bat activity and does not equate to the number of bats.

### Bat Exclusion From Base Buildings & Replacement Habitats

The results of the study will aid in the implementation and timing of appropriate management methods. The primary recommendation resulting from the bat management plan is bat exclusion from buildings and the installation of bat houses throughout the base to provide replacement habitat for bats evicted from buildings. Bats will be excluded when the bat use is the lowest for a building, as determined by exit surveys prior to a planned exclusion. Without building specific surveys, exclusions will not be attempted during the maternity season to avoid entombment of young or impairment of the reproductive ability of the colony. A “one-way bat valve” that

allows bats to exit a building but not re-enter will be used to exclude the bats. Plastic sheeting or some other slick material taped to exit/entry points is usually effective, if left in place for several nights, and then the exit/entry points are sealed. The buildings at Point Mugu present unique challenges because the areas used by the bats to enter the buildings are difficult both to reach and to attach plastic sheeting. The buildings are large, and logistically the bats cannot be excluded simultaneously from all the access points. Exclusion measures and sealing will be sequentially employed, with the realization that excluded bats may continue to enter the structure through other unsecured holes. In the past, foam has been the exclusion method employed on most buildings at Point Mugu. The foam is relatively easy to apply, but it is a short-term solution due to its UV sensitivity that causes it to disintegrate. Therefore, pre-cut scalloped foam/rubber inserts, which appear to be a more permanent barrier to the bats, will be used. An ongoing maintenance program will be an essential aspect to ensuring the success of bat exclusion efforts. In addition, base personnel are being educated on how they can help prevent the occasional bat from entering work areas and becoming trapped. Holes in office ceilings, such as missing tiles, should be repaired and doors and unscreened windows kept closed at night.




Much research has gone into the design of bat houses. Different designs work best for different species in different geographic locations. In some areas, bat houses have had considerable success as documented by North American Bat House Research Project sponsored by Bat Conservation International. However, no information exists for bat house use near Point Mugu. Therefore, the current project will hopefully contribute to the database. Two styles of bat houses are being erected on Point Mugu. Eleven relatively small houses are being positioned in areas where the bats forage. Temperature dataloggers have been installed in each house to determine if temperature is a factor in roost preference. These houses will probably be most attractive to the smaller bats, such as Yuma Myotis (*Myotis yumanensis*). By strategically locating these bat houses near foraging areas, the base benefits from the biological pest control provided by these consumers of mosquitoes.

The larger “bat condo” (offering diverse temperatures) will be

installed on top of one of the warehouses close to an existing Mexican free-tailed bat colony. The goal is to attract the bats from the adjacent buildings prior to exclusion activities. Exclusion of bats from buildings will be phased to allow time for the bats to discover and use the condo. If a large bat colony was evacuated from a building prior to acceptance of the bat condo, the excluded bats could become a nuisance in other buildings on base. The preferred alternative, therefore, is to allow the bats to discover and relocate to the condo prior to exclusion. All bat houses will need to be monitored periodically for bat use (as evidenced by guano in traps below the houses). Some experimentation may be necessary to design a “bat condo” that is accepted by the bats.

**The Bat Management Approach: Mitigating the Presence of Bats in Workspaces**

The bat management approach being implemented at NBVC Point Mugu is

intended to mitigate the presence of bats in the workspaces of base personnel. The incidence of rabies in most bat populations is less than one half of one percent. When bats become infected, they become ill with the disease, and the virus is present in their saliva. On the average about one person a year in the United States contracts bat rabies, as identified by having become ill with the strain of the rabies virus associated with certain bat species (Brass 1994). Of sick bats turned into Public Health centers, an average of 10 percent a year test positive for rabies. The only disease associated with bats other than rabies is histoplasmosis, a fungus that causes lung disorders when the spore is inhaled. The occurrence of the disease is geographically localized. For transmission to occur to humans, a very dusty environment combined with dry bird and bat droppings (guano) is necessary. Fresh guano is smelly and unsightly, but no health risks are associated with it. Through a proactive approach, the NBVC Environmental office is attempting to address the concerns of base personnel. In addition, the needs of some valuable species are also being met. 

*Note: Patricia Brown-Berry from Brown-Berry Biological Consulting made significant contributions to this article.*

**Bat Housing At Naval Base Ventura County**

House	Size	Capacity (in number of bats)
Small	32 inches tall	200+
	18 inches wide	
	4.75 inches deep	
Medium	24 inches tall	up to 300
	16 inches wide	
	6 inches deep	
Largest	24 inches tall	up to 600
	20 inches wide	
	7 inches deep	
"Bat Condo"	4 feet tall	several thousand
	8 feet wide	
	4 feet deep	

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# China Lake and the Tui Chub

## Conducting a Census and Managing the Habitat of an Endangered Fish

**I**n addition to the installation's primary mission of direct fleet support, Naval Air Weapons Station (NAWS) China Lake has been monitoring the endangered Mohave tui chub fish and managing its habitat. To that end, approximately \$40,000 and 300 man-hours are spent every year.

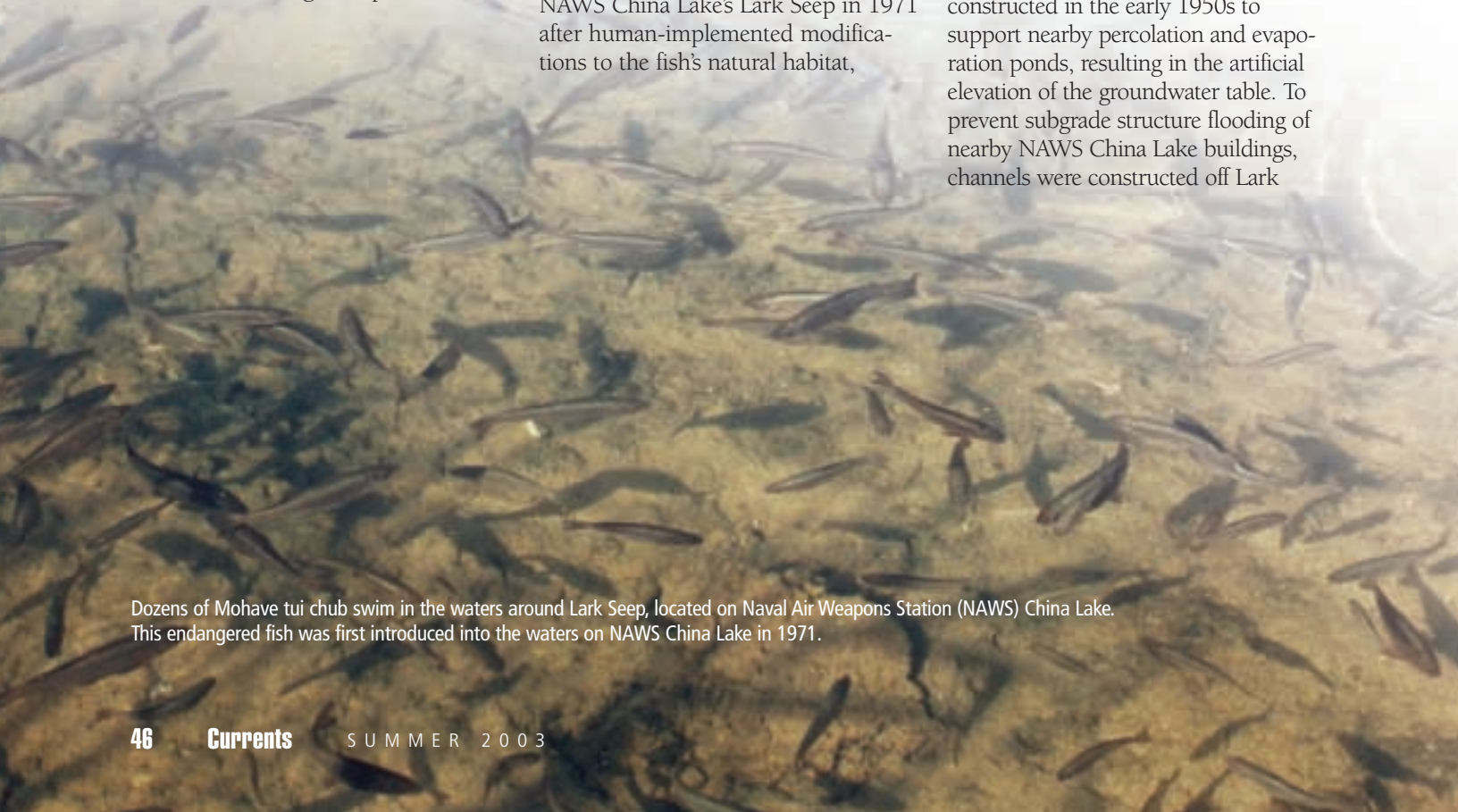
The chub (*Gila bicolor mohavensis*) was included on the federal list of endangered species in 1970 and on California's endangered species list in

1971. According to the United States Fish and Wildlife Service (USFWS), NAWS China Lake is one of four locations in North America with a genetically pure chub population. In fact, although there has been no critical habitat designation for the fish, China Lake's chub population numbers approximately 6,000 and may be the largest pure population in existence.

The USFWS and California Department of Fish and Game (CADFG) introduced 400 chub to NAWS China Lake's Lark Seep in 1971 after human-implemented modifications to the fish's natural habitat,

which included the Mojave River from the San Bernardino Mountains to its terminus at Soda Dry Lake, resulted in the species' decline. NAWS China Lake Biologist Steve Pennix said the introduction of the chub into Lark Seep was not intended to be permanent—chubs were only supposed to be kept there while the agencies looked for other sites. However, once the fish was released into the seep, there was no way to remove them all, and no effort to remove them was undertaken.

By the time of the chub's arrival, Lark Seep had expanded in volume dramatically as a result of the increased activity of the nearby Wastewater Treatment Facility (WWTF). The WWTF was constructed in the early 1950s to support nearby percolation and evaporation ponds, resulting in the artificial elevation of the groundwater table. To prevent subgrade structure flooding of nearby NAWS China Lake buildings, channels were constructed off Lark



Dozens of Mohave tui chub swim in the waters around Lark Seep, located on Naval Air Weapons Station (NAWS) China Lake. This endangered fish was first introduced into the waters on NAWS China Lake in 1971.



A biologist with Naval Air Weapons Station (NAWS) China Lake's Environmental Planning and Management Department inspects a Mohave tui chub near Lark Seep on the base. It is believed that NAWS China Lake has the largest population of the endangered fish at 6,000.



Seep in the 1970s in order to convey the high groundwater away from the facilities out onto the China Lake playa, thereby forming the artificial G-1 seep. This system of seeps and channels is now the habitat of the chub.

Because of the encroachment of cattail and tamarisk, the water level and, thus, the fish's habitat, began to shrink in 1990. Another contributor to the decreased water level has been base downsizing and the loss of housing, which has resulted in a decrease in the quantity of water treated at the WWTF. In addition, natural predators such as bullfrogs, catfish, koi and snapping turtles prey on the chub.

NAWS China Lake Environmental Planning and Management Department (EPMD) developed a Mohave tui chub management plan that includes conducting a chub census and managing its habitat. In order to monitor the fish's population fluctuation and migration patterns, and as a safer alternative to fin clipping, natural resources personnel at NAWS China Lake began using Visible Implant fluorescent Elastomer (VIE). Fin clipping, a standard method for marking fish that involves cropping a specific fin, has some limited potential for increased fish mortality and infection, unpredictable fin regeneration, and confusion regarding natural fin loss. VIE is essentially a liquid dye which is injected into the jaw line of the fish by a hand applicator. The dye soon cures into a pliable, bio-compatible solid whose color is then used to

identify previously marked fish. By using different colors, biologists can identify from which channel of Lark Seep the fish came and whether migration is taking place between channels. A single dye injection is designed to last the life of the fish.

But monitoring the chub's population, like that of any other fish's population, is a difficult task, especially because population numbers fluctuate in cycles.

"Due to the complexities of the habitat and channel ecosystem, there is no really good handle on population trends of the chub," Pennix said.


However, personnel make sure that the fish's relative numbers don't get dangerously low.

Chub habitat management includes the monitoring of water quality, and even the removal of cattail and tamarisk. In order to accomplish plant removal and retain the viability of the ecosystem, the removal is limited to two miles of the channel system. To protect the chub population, the fish are scared away immediately prior to the onset of removal work.

In efforts designed to increase chub numbers, NAWS China Lake EPMD is exploring the potential of transferring

chub eggs and rearing juveniles to other off-station habitats, as well as the potential for a cooperative, interagency effort to relocate chub adults to other habitats. Additional options could include clearing and deepening the channels and the Lark Seep itself. Of course, any maintenance conducted on the channel system has to be done with the chub in mind.

Although nurturing the chub doesn't directly benefit NAWS China Lake's main mission, the installation avoids both civil and criminal liabilities by meeting requirements spelled out in the Endangered Species Act (ESA).

"We work hard to protect, enhance and maintain natural resources while not compromising the ability of the station to meet the requirements of its mission," Pennix said. 

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# Spot Corrosion Repairs Using the Radial Bristle Disc

## Discs Now Approved for Use on Aircraft Substrates

**A**brasive wheels and flap brushes have long been used for small corrosion and paint removal applications on aluminum surfaces. However, these technologies can also remove more than just corrosion—they remove critical portions of the metal substrate as well.

Recently, the Naval Air Systems Command (NAVAIR) authorized the use of the 3-inch radial bristle disc for removing coatings and corrosion from aluminum substrates. Introduction of this technology to the Fleet was conducted in accordance with Interim Rapid Action Change (IRAC) #26 to

the Aircraft Weapons Systems Cleaning and Corrosion Manual (NA-01-1A-509) and was introduced as a replacement for the flap brush and abrasive wheel. Naval Air Depot (NADEP) North Island issued IRAC #26 Date Time Group 171121Z April02. Laboratory testing is being conducted with the discs on high strength steel, magnesium, titanium and composite surfaces. Once testing has been completed, authorization for the use of bristle discs on these additional surfaces will be addressed via a separate IRAC.

### Bristle Disc Characteristics

The bristle discs are comprised of a polymer that contains aluminum oxide and a proprietary element, which gives the discs their grit equivalency. Two types of discs have been approved for use within the fleet. For external aluminum surface application, an orange disc with a grit equivalency of 400 has been designed for use on light surface corrosion discrepancies, such as filiform, and is also ideal for edge feathering. A yellow disc with a grit equivalency of 360 has been designed for use on heavier corrosion and light

to moderate surface pitting discrepancies. The yellow disc is also capable of removing light amounts of sealant around access panels and other similar structures.

Naval Air Depot (NADEP) Jacksonville has successfully completed testing on both discs and has recommended the yellow and orange discs for application on high strength steel and titanium surfaces. A formal IRAC to the NA 01-1A-509 will be issued shortly to include the utilization of both discs for use on high strength steel and titanium substrates.

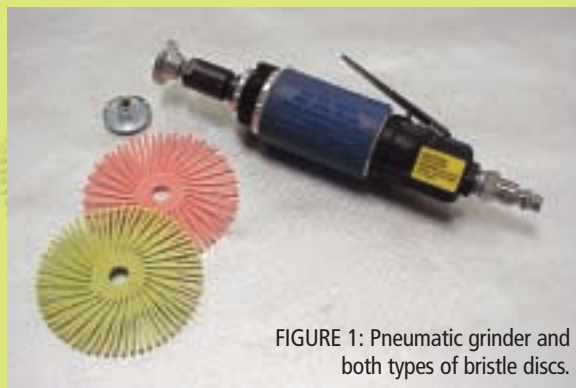


FIGURE 1: Pneumatic grinder and both types of bristle discs.

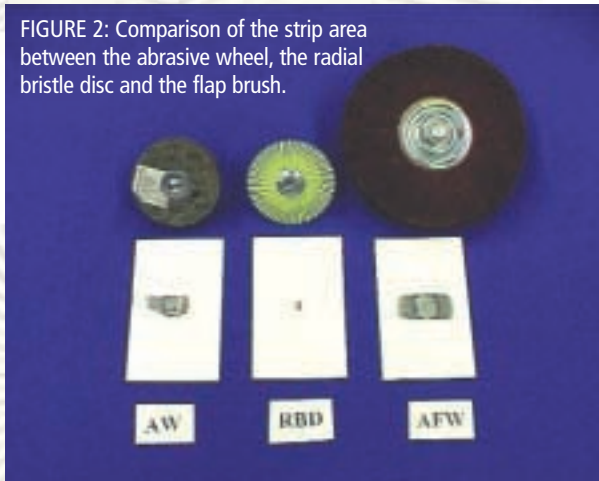


VAQ-131 corrosion control personnel aboard the USS Constellation in the Persian Gulf. (BACK) AM3 Jason Clark, AM3 Josh Lawson. (FRONT) AM3 Shane Lee, AM3 Joy Timpog.

Both the yellow disc, 360 grit equivalent, and the orange disc, 400 grit equivalent, are highly effective in removing organic coatings from both steel and titanium substrates. Authorization is pending for the 360-grit equivalent bristle disc for use in removal of light surface oxidation on high strength steel components without causing heat damage to the metal. However, the 360-grit disc is



FIGURE 2: Comparison of the strip area between the abrasive wheel, the radial bristle disc and the flap brush.



not recommended for utilization on moderate to heavy corrosion on high strength steel.

The 400-grit equivalent bristle disc is not recommended for any corrosion removal, as it is too light in abrasiveness; therefore it is only effective for organic coatings removal on high strength steel surfaces.

The working area of the discs is 0.75 inches. The effectiveness of the tool will expire once the bristle fingers are worn down to the disc hub. At this point, the tool is rendered ineffective and must be replaced with a fresh disc. Figure 1 displays the two types of available colors, with pneumatic grinder and mandrel assembly.

### Bristle Disc Operation

The bristle disc requires an air source of 90-110 pounds per square inch along with a high-speed pneumatic die grinder rated from 22,000 -25,000 revolutions per minute (rpm) and a

mandrel assembly. (Note: The existing pneumatic grinders in the Fleet are not rated for the bristle disc technology. The existing grinders are not adequate because they only spin at 3,200 rpm.) Operating the grinder at its maximum rated speed is required to ensure maximum efficiency and effectiveness. It is only necessary to apply a small

amount of pressure to the tool in order to strip a surface. The tips of the bristles are the working element of the tool. Maintaining light pressure on the grinder and moving the grinder either in a vertical or horizontal manner over the affected area will achieve the best result. If too much pressure is applied, the bristles will fold and render the tool inoperative without damaging the surface. With the old abrasive wheels and abrasive flap wheels, increased pressure caused the wheels to grind into the bare metal causing "valleys" to form. The bristle disc creates a small, self-contained stripped area without removing excessive coating, as displayed in Figure 2.

### Mounting the Bristle Disc on the Mandrel

The bristle disc must be positioned on the mandrel assembly with the arrow facing in a clockwise direction. (Note the directional rotation arrow on the disc hub.) The disc fingers are angled

away from the direction of the grinder rotation as shown in Figure 3. (Note the angle of the tips of the disc fingers.) This is the correct installation procedure.

Placing the disc on the mandrel in a counter-clockwise fashion will damage the aluminum substrate and the tool. If the disc fingers are angled toward the direction of the grinder rotation, they will separate from the disc hub. When operating the tool in this manner, damage to the substrate and personal injury may result from disc finger separation. Figure 4 indicates the incorrect position of the disc when mounted on the mandrel assembly.



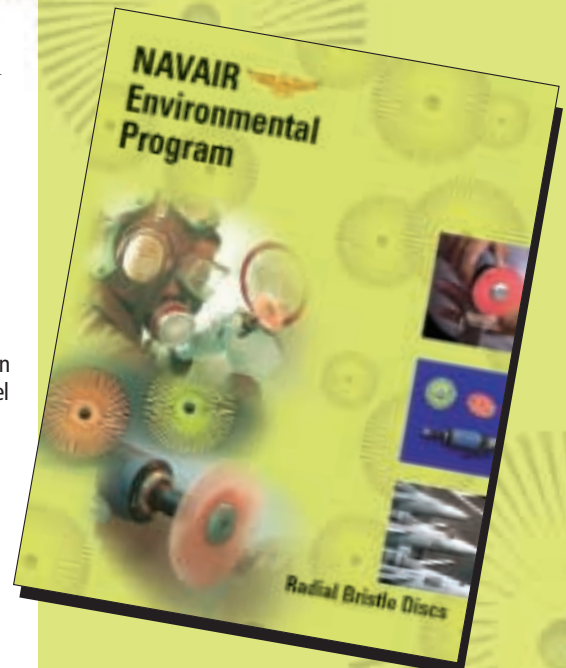
FIGURE 3: Correct angle of the disc fingers when mounted on the mandrel assembly. Note the disc fingers are angled toward the direction of the grinder rotation.



FIGURE 4: Incorrect position of the disc when mounted on the mandrel assembly. Note the disc fingers are angled against the direction of the grinder rotation.

## Bristle Disc Fact Sheet Available on the Web

A fact sheet on the proper use and procurement of the radial bristle discs is available for downloading via the NAVAIR environmental web site at [www.enviro-navair.navy.mil](http://www.enviro-navair.navy.mil) ("dot-mil" restricted).



# Key Features

## of the Radial Bristle Disc

- **Labor Reductions**  
Bristle discs can result in a 50 percent reduction in labor for small corrosion removal and paint applications on aluminum. This is because the uniform concentration of mineral provides a high cut rate for a faster, more uniform finish.
- **Saves the Substrate**  
Bristle discs will not degrade bare metal like the flap brushes can. The flexible bristles of the discs conform to the contours of the part for consistent results without removing base material. This reduces the amount of damage done and the rework required.
- **Reduced Surface Temperature**  
The bristle disc produces about 100 degree Fahrenheit (F) surface temperature, while the abrasive wheels yielded temperatures around 200 degrees F.
- **Reduced Treatment Area**  
Since the bristle discs are more precise and do not remove excess paint, the treatment area required is reduced.
- **Approved for Use on Aluminum**  
The bristle discs have been approved for use on external aluminum surfaces for small corrosion and paint removal applications.\*
- **Approval for Use on High-strength Steel and Titanium Surfaces**  
Pending until a formal IRAC is issued to the NAVAIR 01-1A-509.
- **Easier to Use**  
The bristle disc requires 1.5 pounds of pressure to be applied (via the grinder) in order to remove corrosion. Abrasive wheels require 12 pounds of pressure to accomplish the same task.

*\*The bristle discs have been approved for use only on aluminum surfaces for small corrosion and paint removal applications. They are not to be used inside fuel tanks. Use of the discs on metallic surfaces other than aluminum, may result in damage to the surface. Use of the discs on composite surfaces will result in severe fiber damage to composites.*



LEFT: The old method utilized a low-speed grinder and either an abrasive wheel or flap brush.

RIGHT: The new method employs a high-speed grinder and the radial bristle discs.

## Safety and Health

The use of the radial bristle disc generates dust particles that may contain chromates from primers. Therefore, eye and respiratory protection equipment is required when operating the tool. Improper mounting of the disc on the grinder-mandrel assembly as indicated in Figure 4 can cause personal injury due to separation of the disc fingers from the disc hub. Additionally, damage to the substrate and disc can occur.

## Training

The training required to ensure for the proper operation of the discs is minimal. Naval Air Technical Data and



# The bristle disc creates a small, self-contained stripped area without removing excessive coating.



The orange radial bristle disc is shown being utilized on an E-2C engine nacelle at VAW-120 Norfolk, VA.

Engineering Service Command (NATEC) representatives will perform training as part of regular training to the fleet, and the bristle disc technology will also be included in the Naval Aviation Maintenance Training (NAMTRA) corrosion control curriculum. In an attempt to reach all aviation activities, especially those units afloat and deployed to remote operating areas, a training CD has been prepared by NAVAIR and will be distributed throughout the Fleet. This CD should be available in the spring of 2003.

## Procurement

At the present time, no other commercial off-the-shelf bristle discs meet NAVAIR's specification standards.

Although many types of discs are available on the open market, the only authorized discs are manufactured by the 3M Corporation:

- Orange discs (for light surface corrosion removal): 3M part number 61-5001-8792-9, National Stock Number 4920-01-493-2510, and
- Yellow discs (for heavier corrosion): 3M part number 61-5001-8790-3, National Stock Number 4920-01-493-2514.

The radial bristle discs can be procured in several ways. Discs can be ordered using Military Standard Requisitioning and Issue Procedures (MILSTRIP) or through the federal stock system under the Electronic Mall (EMALL) contract SP0410-01-D-E006. The discs can also be ordered using a unit or squadron credit card directly from the vendor by calling the 3M federal systems requisition representative at 800-944-4181. The bristle discs are packaged in a case of 40, four boxes to the case. Each box contains ten discs. The cost for the discs are \$3.05 each or \$122.00 per case. The pneumatic grinder is approximately \$79.00 and the associated mandrel assembly is \$7.81. National stock numbers and additional information are contained in IRAC #26. ⚓

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## Upgrading Mayport's

# Ship Repair Infrastructure

### Navy Environmental Leadership Program (NELP) Project Includes State-of-the-Art Painting Facilities

**T**he Shore Intermediate Maintenance Activity (SIMA) Mayport continues to progress with its Fiscal Year 2001 Project in cooperation with the Navy Environmental Leadership Program (NELP). Under NELP Fiscal Year (FY) 2001 tasks, construction improvements are progressing to assist SIMA in identifying pollution prevention (P2) opportunities that will reduce or minimize environmental, safety and health compliance costs.

SIMA Mayport performs intermediate maintenance services for the repair of ships in the southeast region of the Navy. SIMA Mayport provides trained personnel and flyaway teams to augment, repair and maintain major components of the various ship

classes at Naval Station (NS) Mayport. SIMA Mayport is housed in an industrial complex with approximately 135,000 square feet of repair shop space and 40,000 square feet of administrative space.



A 1,500-square foot expansion of the current paint/depaint facility is part of the model SIMA construction project.



Sailor in a SIMA paint booth. The new paint booth addition located in the former Foundry Bay, SIMA building is part of the model SIMA construction project.



Naval Station Mayport.



“NELP is using SIMA as a test bed to discover the benefits and downsides of management processes and equipment that reduce pollution while minimizing damage to the environment.”

—LT Greg Cook, NELP Focus Group Member from SIMA

The types of maintenance services provided by SIMA Mayport include machining and engine repair from metal working to painting and depainting operations.

NELP and SIMA personnel found opportunities to apply P2 technologies and improvements in a number of areas at SIMA Mayport to save money and make the deckplate sailor's jobs easier.

To date, completed components of the model SIMA construction include:

- Installation and Testing of the New Paint Booth. Located in the former Foundry Bay, the installation of this booth has vastly improved the quality and efficiency of finished products and enabled the use of efficient High Velocity Low-Pressure (HVLP) spray paint guns and an enclosed paint gun washer that recycles used solvent, eliminating disposal of 360 gallons of hazardous waste annually.
- Expansion of Existing Paint/Depaint Facility. Construction of this 1,500 square foot addition is

complete. New equipment is being purchased to support powder coating application and removal. The parts washer uses an aqueous solution, reducing the solvent usage while increasing effective degreasing capabilities. The closed loop pretreatment system will include an evaporator, virtually eliminating hazardous waste generation. The burn-off and pre-heat ovens will be used to remove the old powder coating and allow the new coating to adhere, all without use of solvents. The walk-in blast booth will be used to remove non-powder coatings.

- Underground Fuel Storage Tank Replacement. Due to the facility expansion, a 20,000-gallon underground fuel oil storage tank has been replaced with a 10,000 gallon above ground tank.

NELP coordinated the research and recommendations for each of the model SIMA improvements. Equipment to be used in the new facility expansion is being purchased using the Navy's

Pollution Prevention Equipment Program. When completed, NELP and SIMA will evaluate the performance of the improvements to ensure they fulfill the P2 concept to meet and exceed regulatory mandates, increase safety, reduce sailor workload and reduce waste generation. The model SIMA construction project is scheduled for completion in fall 2003. ⚓

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# San Nicolas Island

# Takes Out the Trash

## Luau Marks Waste Collection Milestone

**W**hat do you get when you combine 40 long years of Naval operations, 150 tons of trash, more than a hundred volunteers, and an island off the coast of Southern California? Well if you are stationed on San Nicholas Island, the answer would be a luau.

CMDR Ray Schenk, Officer in Charge of San Nicholas Island (SNI), recently held a luau celebrating the milestone of 150 tons of trash being removed off the island. The luau, which was held inside the club on SNI, was complete with leis, Hawaiian shirts and a bonfire.

"When I first arrived on the island I took a walk around and I noticed that there was an awful lot of Navy activity over the past 40 years, but not a lot of clean-up. I joked that it was the island of the blue dumpster, not the island of the blue dolphin," Schenk said. As he was sitting in the club on SNI that night he

decided to take matters into his own hands and to see what he could do about the less than immaculate facility he had been placed in charge of.

Schenk decided to see what kind of community spirit there was in the people who worked for him on the island. So the next day he opened what he likes to call "Operation Night Lizard." Named after an endangered species of lizard on the island, the original intent was to spend some time cleaning up what is known as Nictown—the area where all of the barracks, restaurants and workspaces are located on the facility.

"There were 45 volunteers that day," said Schenk. "Two hours later, we had picked up two tons of trash just from one small area."

Schenk decided to try another cleanup the following week. The subsequent Tuesday, Operation Night Lizard continued. Thirty-six people showed up and, in 90 minutes, picked up more than five tons of trash from around the airfield.

"Every Tuesday, we continued to clean up a different part of the island," said Schenk. "Once we collected 60 tons of garbage, I decided that we needed to update our plan." Schenk closed



SNI Sailors remove old metal equipment matting from a beach.



Public Works and Seabee personnel rig an old launcher for removal from a ravine.



Twenty tons of old missile launcher reaches the top of the ravine from which it was removed.







Island personnel celebrate the removal of a 20-ton missile launcher removed from a deep ravine that marked the beginning of Operation Elephant Seal, the third major cleanup operation to date.

Operation Night lizard and set out a new plan—Operation Decollatta. This operation was also named after an endangered species on the island, a carnivorous snail.

Operation Decollatta required people to volunteer on their own time to stay out on the island on weekends to continue the clean up of more than 40 years of debris that had collected on the island.

“We designed an Operation Decollatta patch like what you put on your flight suit,” said Schenk. “Anyone who worked on the clean-up received one.” The entire medical and weather departments from Naval Base Ventura County flew out to the island to pick up trash. The project took on a life of its own. In January, Operation Decollatta reached the milestone of 150 tons of debris, including paper, cigarette butts, cans and even the carcasses of three aircraft.

“We leveled a trailer park,” said Schenk. “There was a set of seven trailers left to

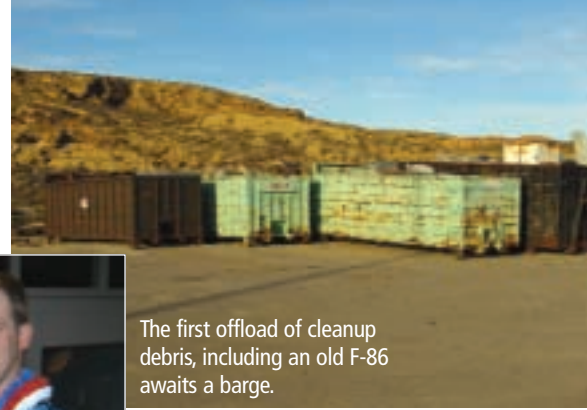


ET3 Cody Cole (right), on behalf of SNI All Hands, presents SNI Officer-In-Charge CDR Ray Schenk with a trashcan plaque for his efforts in initiating the clean-up projects.

rot on the island.” In what he jokingly calls his Anger Management for Sailors, Schenk armed his Sailors with sledgehammers and saws and they tore down that trailer park, making way for a park for recreational vehicles.

At the 150-ton mark, Schenk closed down Operation Decollatta. “It seemed like a good place to stop,” he said. So to celebrate the milestone, a Luau was thrown. “It seemed like the perfect way to thank everyone,” he said.

Of course, 150 tons of trash is a good start but Schenk’s efforts will not stop there. Operation Elephant Seal is the next step in this beautification project. “No dumpster is safe,” jokes Schenk. Operation Elephant Seal will see people volunteering their time to pick up as much trash as they can.



The first offload of cleanup debris, including an old F-86 awaits a barge.



The first major cleanup push involved removing a crashed F-4 Phantom target aircraft from the island.

“It is increasingly important for the Navy to demonstrate that we are good stewards of the natural and cultural resources that we have been entrusted with,” said Schenk. 🚢

*Photos by PH2 Chris Perkins.*

## Summary of Waste Collection Operations on San Nicholas Island

Operation	Waste Collected (in tons)
Operation Night Lizard	60
Operation Rumina Decollata	90
Operation Elephant Seal	48 (to date)
TOTAL	198

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## Southern Division

# Leverages HSMS

### Sound Processes, Add-On Technologies and Good Communications Are Key to System Success

**S**outhern Division Naval Facilities Engineering Command (SOUTHDIV) has employed sound processes, incorporated special technologies and supported good communications to ensure that the Hazardous Substances Management System (HSMS) remains a user-friendly system for tracking hazardous materials.

Developed over six years ago by the Department of Defense (DoD) to manage the vast amount of information related to hazardous materials, HSMS is a database management program that tracks hazardous materials from “cradle to grave”. Supply

management systems such as Hazardous Inventory Control System (HICS) and Regional Hazardous Inventory Control System (RHICS) provide exceptional platforms for ordering and receiving materials. In addition to tracking these materials, HSMS provides a full scope of environmental management tools and unique features designed specifically for the support of environmental programs.

#### Southern Division's Implementation of HSMS

Since the first installation of HSMS at a number of naval activities in the Southeast Region in the late 1990's, SOUTHDIV has worked hand in hand with customers, contractors, and the Navy HSMS Help Desk to make HSMS a user-friendly system. SOUTHDIV has integrated other products to enhance HSMS's capabilities. HSMS is used to reduce management costs for reporting and permitting as well as improve worker safety and health. HSMS projects begin with a customer contacting SOUTHDIV with general or specific requests that could involve any number of tasks. SOUTHDIV engineers develop scopes and schedules to meet the needs and desires of the customer and provide technical, contractual, and onsite assis-



Kurt Hebert demonstrates his intranet HSMS site at Naval Weapon Station Charleston. This site allows users to view AULs, available materials and HSMS user instructions.

tance during implementation of the program, which has proven to be essential to its successful operation.

SOUTHDIV has used the Symbol PDT-7200 barcode reader in concert with HSMS at Naval Air Station Kingsville, Texas. This portable hand held unit allows material and waste transactions to be captured anywhere on the installation and uploaded to a computer at a later time. The HSMS data taken from the barcode reader is captured by a combination of remote scanning of the barcode and the manual entry (via a touch screen) of additional data elements. A script is run in the HSMS program, which automatically imports the scanner information and distributes the data to the appropriate fields and records. No additional processing of the field data is required. The ease with which data can be transferred into HSMS helps to



Barcoded material awaits distribution to work centers. With HSMS, this material can be tracked “cradle to grave.”







A Zebra Bar Code Printer, compatible with HSMS, is used to assign barcodes to hazardous materials.



ENC (SW) Blinson and BU 2 Parker get cost avoidance material as Mary Ann Erese applies an HSMS bar code at Naval Weapon Station Charleston. HSMS allows returned material to be re-barcoded and reissued. This helps the base to stay "CHIMPed."



Empty hazardous material containers about to be recycled. With HSMS barcodes, these containers can be classified as "used" and taken out of the system for very accurate material tracking. This process is made even easier with a portable barcode scanner.

ensure that empty material containers are removed from the system as quickly as possible. This practice has significant pollution prevention benefits, and can refine the level of data available in HSMS for meeting environmental program needs. (The exact quantity of a hazardous material used in a process can be determined rather than assuming that the entire amount sent to a process was used.)

An integrated web based ordering system that works in conjunction with HSMS has been installed at Naval Air Station New Orleans. The system is a customer driven application which enables customers at work center levels to log onto a base intranet web site and view and order materials from their Authorized Use List (AUL). The intranet web site shows the customer inventory available at the base through a real time link to HSMS. The application sends an email with the order information to the hazardous materials (HM) center. After processing, the HM center alerts the customer when the order request is available for pick up.

### Innovative Uses of HSMS

Naval Weapon Station Charleston has a very useful HSMS link on their intranet site. This link allows access to Crystal reports, which provide shop AULs, the master AULs, outstanding material reports and available re-use materials from the Consolidated Hazardous Material Reutilization and Inventory Management Program (CHIMP) center. For users of the HSMS system, the intranet site provides menus with instructions detailing transactions in HSMS. There is also a function that allows the

HSMS coordinator to answer HSMS related questions. This website allows users of the system to have base-wide access to the information in HSMS without having to hold individual software licenses.

An HSMS Safety module allows AULs to be maintained in real time in a database. Naval Air Station Meridian and Naval Weapon Station Charleston have had great successes with their Safety modules. To request a new hazardous material at a work center, a new item request sheet is completed and a Material Safety Data Sheet (MSDS) is attached. The forms are then faxed to the HM center. HM center personnel input the appropriate material into HSMS, which automatically sends the information to Environmental and Safety electronically. Personnel from the base's safety office then review the material, how it will be used, and decide whether or not to grant approval to use the material. Personnel from the environmental office review the material and assign the appropriate process codes. At this point, the material will be added to the particular work centers AUL and approval will be given for the purchase of the item. The AUL, kept in HSMS, will be updated in real time, a major advantage over "static" AULs kept in spreadsheets or databases not connected with HSMS. With the AUL linked directly to the issuing point, all

people who need access have it and the AUL is kept up to date.

### Successful Implementation of HSMS

Successful implementation of HSMS relies on good communication. Experience has clearly demonstrated that without good communication, HSMS implementation at the base level will fail. Highly successful bases utilize an HSMS working group to talk about and resolve interdepartmental issues as well as to coordinate better use of the program. SOUTHDIR has been a great proponent of the implementation of HSMS as an environmental tool and has supported customers who use it to track material and waste. SOUTHDIR is still focusing on delineating benefits of the full use of HSMS and identifying potential uses beyond traditional material and waste management. ⚓

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Sailors and Marines Gather at  
ENVIRONMENTAL  
**SWAP MEET**





# Over 100 Attend Fifth Annual NAVAIR Fleet Environmental Exchange

**T**HE NAVAL AIR SYSTEMS COMMAND (NAVAIR) HELD THE FIFTH ANNUAL FLEET ENVIRONMENTAL INFORMATION EXCHANGE (EIE) AT THE NAVAL AMPHIBIOUS BASE SAN DIEGO, CALIFORNIA ON 15-17 APRIL 2003. THIS YEAR'S EXCHANGE WAS CO-HOSTED BY NAVY REGION SOUTHWEST.



Over 100 Fleet representatives from various Navy and Marine Corps hazardous material, supply, support equipment, ordnance and corrosion control programs attended this year's Exchange to discuss environmental aviation-related issues with NAVAIR's environmental and acquisition experts. The Exchange also provided opportunities for sailors and Marines to learn about new and emerging technologies, network with the Navy's environmental experts and receive training credits.

The primary goal of every EIE is to identify unresolved Fleet environmental needs and provide solutions in real time at the meeting. Needs that not cannot, for whatever reason, be resolved at the EIE are assigned to the appropriate NAVAIR subject-matter expert for follow-up action.



A number of military representatives from the Aviation Intermediate Maintenance Department (AIMD) North Island attended this year's EIE. They provided great insights into the aviation maintenance challenges facing the Fleet today. AIMD North Island personnel included: (BACK) AS1(AW/SW) Jason Hoff, AS2 Jason Block. (FRONT) AM2(AW) Dana Dean, AS2 Victor Elias, AM1(AW) Lisa Beaudou.

This year, the assembled sailors and Marines identified fifty action items for NAVAIR's environmental community to tackle. These items range from the availability of preferred maintenance equipment to the proper use of hazardous materials. In particular, the following issues were raised during the course of the 2003 EIE. The Fleet needs:

- Access to recyclable lint-free rags. The Fleet also needs to change the relevant publication requirements to allow for the use of lint-free rags for certain maintenance procedures.
- To consider the costs and benefits associated with implementing a close-loop system to the recycling/reuse of rinse waters from our plating and paint stripping operations.
- A list of the schools and follow-on schools authorized to teach perform the duties involved in operating hazardous materials and hazardous waste sites (including State and local management requirements) incorporated into OPNAV 4790.2 Chapter 20.



## Mark Your Calendars for the **2004 EIE**

**WHEN:** APRIL 2004

**WHERE:** EAST COAST

**WHO:** ANYONE IN THE FLEET  
WITH ENVIRONMENTAL  
RESPONSIBILITIES IS WELCOME





# RAVES

## About the 2003 EIE

- "THE EIE IS THE BEST BRIDGE TO CONNECT THE FLEET TO NAVAIR."
- "DIRECT INTERACTION WITH THE FLEET MAINTENANCE PERSONNEL ON ISSUES REGARDING MATERIALS AND PROCESSES IS INVALUABLE."
- "KNOWLEDGE IS POWER AND I FEEL THAT THERE WAS PLENTY OF KNOWLEDGE TO BE OBTAINED."
- "WHAT YOU HAVE IS AN OVERWHELMING ASSET TO THE FLEET AND NEEDS TO BE MAINTAINED..."
- "I WAS FLOORED BY THIS CONFERENCE. IT WAS MY FIRST CONFERENCE—I HOPE IT WON'T BE MY LAST."
- "IN ONE WORD—ENLIGHTENING."
- "I NOW HAVE THE IDEAS AND RESOURCES I NEED TO PERFORM MY JOB MORE PROFICIENTLY."
- "I DISCOVERED NEW TECHNOLOGIES TO SUPPORT OUR OPERATIONS."
- "I WAS VERY PLEASED WITH THE BREADTH AND DEPTH OF THE EXPERIENCE AT THIS YEAR'S EIE."
- "I WILL SURELY RECOMMEND THE EIE THROUGHOUT MY COMMAND."

- Access to environmentally controlled hazardous materials storage lockers.
- A more efficient way of recovering Freon from aircraft and shipboard systems.
- An authorized method for removing oil from honeycomb material.
- To move towards lead-free soldering
- Clarification on when Fleet maintenance personnel are required to take a hydraulic sample from an aircraft.
- Particle counters for use at the squadron level (since P-D-680 will be no longer available for patch testing).
- Access to Digital Radiography units through the Pollution Prevention Equipment Program (PPEP).





## It Takes a MULTIDISCIPLINARY TEAM

As more and more sailors and Marines are drawn to the EIE each year, it takes more and more effort to pull off a successful event.



Lynn Cahoon, the principal architect of the EIE, assembles a multidisciplinary team each year to address the increasingly complex task of organizing and executing an impressive EIE.

For this and each of the previous year's Exchanges, Lynn reached across NAVAIR and



EIE Core Team: (BACK) Bruce McCaffrey, Lynn Cahoon, Ebbie Crockett, Scott Mauro. (FRONT) Tom Doughty, Kathy Fallis, Kelly Burdick. (Not shown, Mike Romanelli.)

into the NAVFAC and NATEC communities and also tapped a professional facilitator to help him plan and implement the EIE. Feedback from this year's Exchange seems to confirm that the efforts of Lynn and his team were well worth it.

Who	Organization	Expertise
Lynn Cahoon	Material Engineering Laboratory Naval Air Depot Cherry Point, NC	<ul style="list-style-type: none"> <li>Materials engineering</li> <li>Hands-on experience with Fleet maintenance processes</li> </ul>
Scott Mauro	Naval Facilities Engineering Service Center (NFESC)	<ul style="list-style-type: none"> <li>AV-8B Environmental Safety &amp; Occupational Health Coordinator</li> <li>Naval facilities perspective</li> </ul>
Ebbie Crockett	Naval Air Technical Data and Engineering Service Command (NATEC)	<ul style="list-style-type: none"> <li>Logistics community perspective</li> <li>Maintenance manual perspective</li> </ul>
Kathy Fallis	Naval Air Warfare Center Weapons Division, China Lake, CA	<ul style="list-style-type: none"> <li>Chemistry laboratory, research and development perspective</li> <li>Range issues and experience (including ordnance expertise)</li> </ul>
Kelly Burdick	NAVAIR Environmental Public Affairs	<ul style="list-style-type: none"> <li>Public affairs</li> </ul>
Mike Romanelli	Lead Maintenance Technology Center for the Environment (LMTCE)	<ul style="list-style-type: none"> <li>Depot-level maintenance experience</li> </ul>
Tom Doughty	Aerospace Materials Laboratory Naval Air Station Patuxent River, MD	<ul style="list-style-type: none"> <li>Research and development</li> <li>Hands-on experience with Fleet maintenance processes</li> <li>Retired Naval officer</li> </ul>
Bruce McCaffrey	Bruce McCaffrey Consulting, Inc.	<ul style="list-style-type: none"> <li>Meeting facilitation</li> <li>Meeting planning</li> </ul>

- To be able to produce letters/numbers as well as national insignia and the required NATO markings with the stenciling and marking machines available to them. The Fleet also needs training on the proper operation and maintenance/repair of this equipment.

EIE attendees also benefit from hands-on demonstrations of new technologies at the Exchange's tradeshow.

Demonstrations included the proper use of technologies already transitioned as well as those that are emerging from the Navy's laboratories. NAVAIR wants to make sure the Fleet has the latest and greatest technology and the knowledge to properly apply it. This year's Tradeshow took place on the final day of the EIE and incorporated hands-on demonstrations of a number of innovative maintenance technologies including a number of corrosion

## A HISTORY OF THE ENVIRONMENTAL INFORMATION EXCHANGE

Where	When	Attendees & Action Items	Details
Jacksonville, FL	September 1999	A dozen attendees identified 28 action items.	Hurricane Floyd resulted in low attendance.
New Orleans, LA	June 2000	40 Fleet representatives identified over 30 action items.	Evening trips to Bourbon Street added some color to the meeting.
San Diego, CA	June 2001	Nearly 100 sailors identified 70 action items.	First EIE tradeshow exposed attendees to innovative maintenance technologies.
Norfolk, VA	June 2002	Over fifty attendees including two dozen sailors and marines identified 47 action items.	Large contingent of Marines present.
San Diego, CA	April 2003	Over 100 attendees identified several dozen action items.	Attendees received hazardous materials management training.



Members of the Lead Maintenance Technology Center for the Environment (LMTCE) Working Integrated Product Team (WIPT)—engineers of the EIE.



control technologies as well as tools to assist in corrosion touch-up repairs, sealant and mildew removal tools as well as particle counters, paint gun cleaning technologies and new aircraft wash pads.

At this year's EIE, sailors and Marines also received a half-day refresher course on the proper management of hazardous materials from Odessa ("Odie") Newman-Staples, the hazardous materials manager from Naval Air Weapons Station, China Lake, CA. Odie and her presentation on "The Occupational Health and Safety Administration (OSHA) Hazard Communication Standard" were very popular with the assembled sailors and Marines. Representatives from the Civil Engineering Corps Officers School (CECOS) provided an overview of CECOS's classroom and web-based training services. CECOS representatives also provided a presentation on the Navy's BASH (Bird Aircraft Strike Hazard) program.

As in past years, this year's agenda was Fleet-driven. NAVAIR solicited topics for the agenda and asked a number

of Fleet personnel to present their own perspectives and/or solutions to today's environmental challenges. Among the Fleet representatives who provided their points of view were GySgt Russell Sharpmack (from Marine Corps Air Station (MCAS) Beaufort, SC), AMC Fred Matazzoni (from the Aircraft Intermediate



## Lead Maintenance Technology Centers Participate in 2003 EIE OPEN FORUM

The following Lead Maintenance Technology Centers (LMTC) participated in an open forum on the second day of the 2003 EIE:

Lead Maintenance Technology Center	Representative
Shelf Life	Debbie Trautman
Product Preservation	Louise Nicoloff
Tire & Wheels	Keith Finch
Non-Destructive Inspection (NDI)	Bob Mathers Sam Bullard
Adhesives, Bonding & Sealants	Doug Perl
Composite Repair	Bill Alexander
Fluid Contamination	Jackie Grant
Liquid Oxygen	David Schmidt
Fuels & Lubricants	Rick Kamin

## 2003 EIE Tradeshow Showcases

# INNOVATIVE MAINTENANCE TECHNOLOGIES

NAVAIR's aviation maintenance experts demonstrated the following technologies at the 2003 EIE tradeshow:

1. SUPPORT EQUIPMENT STENCILING
2. PARTICLE COUNTERS
3. THERMAL IMAGERY
4. SELF-CONTAINED CORROSION CONTROL KIT
5. RADIAL BRISTLE DISCS
6. SEALANT REMOVAL TOOL
7. MILDEW REMOVAL KIT
8. AIRCRAFT WASH PADS
9. "SOL-GEL" SURFACE PREPARATION
10. LASER "PAINT ASSIST" TECHNOLOGY
11. NAVAIR INFORMATION PORTAL
12. PAINT GUN CLEANING SYSTEMS
13. DIGITAL RADIOGRAPHY

## Some Actions

# REQUIRE MORE WORK

**S**ome issues are raised at an EIE but are too complex to resolve within the confines of the Exchange. At the 2001 Environmental Information Exchange, representatives from the Marine Air and Logistic Squadron (MALS) 39 (located at Marine Corps Air Station Camp Pendleton, CA) initiated an action to address the current limited availability of field-worthy materials for bonding the leading edge of H-46 helicopter blades. The problem for MALS-39 was that the Structural Repair Manual called out an A-1100 silane solution that is only provided by materials engineering laboratories located at maintenance Depots. MALS-39 needed field access to A-1100. Lacking the proper materials, field-level bonds are not durable and have resulted in catastrophic failure. A sol-gel surface preparation using AC-130 was identified and approved for field repairs. (NOTE: The term "Sol-Gel" is a contraction for 'solution-gelation' and refers to a series of reactions where a soluble metal species (typically a metal alkoxide or metal salt) hydrolyzes to form a metal hydroxide.) The sol-gel surface preparation has been assigned a stock number and ordered by the appropriate program manager. Field demonstrations are scheduled in early FY04. (For more information about "Sol-Gel," please see our story "New Technologies for Bonding Surface Preparation: Using Sol-Gel to Get the Chrome Out" in this issue of Currents magazine.)



Maintenance Department (AIMD) Whidbey Island, WA) and AM1 Randy Sudbrock (from the VFA-131 squadron at Naval Air Station Oceana, VA).

Plans are already underway for the 2004 EIE to be held on the East Coast at a location that has yet to be determined. A Naval message will be distributed in January 2004 to officially announce the 2004 EIE and solicit topics for the agenda. [↗](#)

*Photos by Jeff Christensen, America's Finest Portraits.*

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## SERDP and ESTCP to Host Partners in Environmental Technology Symposium

### Program to Focus on Ensuring the Sustainability of Military Testing and Training Ranges

The Partners in Environmental Technology Technical Symposium & Workshop, sponsored by the Strategic Environmental Research & Development Program (SERDP) and the Environmental Security Technology Certification Program (ESTCP), will be held 2–4 December 2003, at the Marriott Wardman Park Hotel, Washington, DC.

#### Technical Program

This year's program will feature comprehensive sessions that will illustrate how SERDP and ESTCP research & development and demonstration & validation efforts are assisting the Department of Defense (DoD) to address increasingly complex environmental challenges. The preliminary list of technical sessions includes the following:

- Challenges of Dense Non-Aqueous Phase Liquid (DNAPL) Source Zone Remediation
- Monitored Natural Attenuation of Chlorinated Solvents
- Perchlorate Monitoring and Treatment
- Advanced Electromagnetic Induction (EMI) for Unexploded Ordnance (UXO) Detection and Discrimination
- Wide Area Unexploded Ordnance (UXO) Characterization
- Range Impacts Inside and Outside the Fence
- Indicators for Range Sustainability
- Heavy Metal-Free Corrosion Protection
- Environmentally Benign Alternatives to Heavy Metals Plating
- Environmental Impacts of Munitions on Ranges
- Bioavailability of Contaminants in Sediments
- Environmentally Safe Fire Suppression Systems



#### Other Highlights

- Poster sessions that feature more than 200 technical posters facilitating technology transfer.
- Exhibit booths offering information about funding opportunities in related research programs.
- A concluding session providing a summary of SERDP and ESTCP program development and opportunities to conduct research and demonstrations.
- Networking with more than 800 environmental professionals.

#### The Sponsors

The Strategic Environmental Research & Development Program (SERDP) is DoD's corporate environmental research and development program, planned and executed in partnership with the Department of Energy and the Environmental Protection Agency, with participation by numerous other federal and non-federal organizations. To address the highest priority issues confronting the Services, SERDP focuses on cross-service requirements and pursues high-risk/high-payoff solutions to the DoD's most intractable environmental problems.

The Environmental Security Technology Certification Program (ESTCP) is DoD's environmental technology demonstration and validation program. ESTCP's goal is to identify, demonstrate, and transfer technologies that address DoD's highest priority environmental requirements. The Program promotes innovative, cost-effective environmental technologies through demonstrations at DoD facilities and sites.

#### Additional Information

For additional information, please visit [www.serdp.org](http://www.serdp.org) or [www.estcp.org](http://www.estcp.org) or call the Symposium Contact Line at 703-736-4548. If you would like to receive the Technical Program & Registration brochure and you are not yet in the SERDP/ESTCP mailing database, please subscribe to the database via one of the web sites. ⚓

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## 2003 Navy Natural Resources Conference Set for December

Conference to Take Place in Jacksonville, FL



The 2003 Navy Natural Resources Conference will be held at the Adam's Mark Hotel in Jacksonville, FL from 8 to 12 December.

Sponsored by Commander, Navy Region Southeast, the conference will provide Navy, military and civilian personnel a forum to raise issues, and share success

stories and lessons learned from all aspects of natural resources management. The theme for this year's conference will be "Natural Resources Management: Ensuring the Navy's Mission and Operational Readiness."



The conference will feature sessions throughout each day on topics such as the Endangered Species Act (ESA), marine mammal research, coral reef research and sound in water.

Registration for the conference is free. Those interested in registering or looking at the conference agenda should go to the following website: <http://www.navseic.com/NNR2003>,



using "NNR2003" as the user name and "N456" as the password. The registration form can be completed and submitted online, or printed and faxed to 703-416-1178 or mailed to the following address:

NNR 2003 Conference  
c/o Robyn Sweet  
Geo-Centers, Inc.  
1755 Jefferson Davis  
Highway  
Suite 910  
Arlington, VA 22202

A block of rooms at the Adam's Mark Hotel has been reserved for conference attendees. In order to book a room at the hotel, call 800-444-2326; mention the Navy Natural Resources Conference in order to receive the special conference rate. Reservations must be made by 8 November 2003. ⚓



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## NFESC Launches Storm Water Web Site

### Best Management Practices & Other Resources Now Online

The Naval Facilities Engineering Service Center (NFESC) developed the Storm Water Best Management Practices (SWBMP) web site to assist Navy environmental professionals and their contractors in assessing methods of reducing pollution in storm water runoff. The SWBMP (at <http://enviro.nfesc.navy.mil/stormwaterbmp/>) adopts the "smart buyers guide" approach to obtaining information on pollution prevention and treatment best management plans (BMPs) and other storm water related information. NFESC believes that the use of this new online resource will help Navy personnel meet their storm water compliance goals.

The implementation of storm water control measures currently costs the Navy over four million dollars a year. These costs are required to comply with current National Pollution Discharge Elimination System (NPDES) Phase I and Phase II requirements.

With stricter total maximum daily loads expected in the near future, and increasing public pressure to protect our nation's water bodies, storm water managers are facing greater challenges to remain in compliance.

On the SWBMP web site, the BMPs are divided into pollution prevention options and treatment options. To help the user identify pollution prevention options that are useful for their specific storm water needs, the SWBMP web site provides a variety of ways of choosing the appropriate pollution prevention options, including an alphabetical listing and a listing by industrial categories. Each pollution prevention option (available in HTML, Word and PDF formats) contains a description, implementation guidance, training requirements, effectiveness, cost and limitations.



Sample treatment BMP.

The user can select appropriate treatment options. There are two methods of selecting treatment options—by specifying the required removal efficiency of pollutants or design criteria. For each treatment BMP, a detailed technical report is available in HTML, Word, or PDF formats.

Other features of the SWBMP web site include:

- **Storm Water Rules and Regulations.** A good overall explanation of the U.S Environmental Protection Agency (EPA) regulations for storm water discharges.
- **Hydrology Notes.** A discussion of the selection of the weather data used for the design of the storm water runoff treatment system.
- **A Storm Water Runoff Calculator.** The runoff calculator is a stand-alone computer program for calculating the amount of storm water runoff and the peak runoff rate. The program is based on the method presented in NRCS Technical Report TR-55. The program can be used to generate estimates for equipment selection or cost estimation purposes.
- **Glossary.** A list of definitions of terms commonly used in connection to storm water treatment technology.
- **Web Links.** A list of web links to related storm water web sites.
- **Contact Information.** E-mail and phone numbers for personnel to contact for questions or suggestions on improving the SWBMP web site. [📧](#)

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# Reducing Diesel Engine Particulate Emissions

## NFESC Demonstrates Potential of Self-Regenerating Filters

**T**he Naval Facilities Engineering Service Center (NFESC) recently completed a four-year project to demonstrate the potential of self-regenerating soot filters in reducing diesel engine particulate matter (PM) emissions.

These filters are installed in the engine's exhaust system to trap engine PM emissions and periodically chemically oxidize the soot through a process called "regeneration." The Environmental Security Technology Certification Program (ESTCP) sponsored the project, with additional funding provided by Cummins, Inc. Two types of soot filters were demonstrated, catalyzed soot filters (CSF) that are regenerated using only the heat of the engine and electrically regenerated soot filters.



Removed Thomas bus muffler (left) next to catalyzed soot filter (right).

For the CSFs, a greater than 90 percent particulate matter emission reduction was achieved. The electrically regenerated soot filters exhibited a 62 percent average reduction in particulate emissions. The CSFs also demonstrated a minimum carbon monoxide (CO) and hydrocarbon (HC) reduction of 49 percent and 72 percent, respectively.

The goal of reducing diesel engine PM emissions has become more important in recent years. Although diesel engines are known to emit several other types of air pollutants including CO, HC, and nitrous oxides (NO<sub>x</sub>), the emissions of PM are of special concern because of their effect on human health. Small particulate matter, specifically those having diameters of less than 2.5 microns, have been identified as a potential human carcinogen. To address this concern, the Environmental Protection Agency (EPA) has recently issued regulations to reduce the allowable PM emissions. These standards are applied to equipment and vehicles at the time of manufacture.

As an example, the model year 2007 EPA highway emissions limits of 0.01 gram per brake horsepower hour (g/bhp-hr) represent a 90 percent reduction from the 2000 model year baseline and a 98 percent reduction from the 1990 baseline. Because these emissions decreases do not affect existing diesel engines, the full benefit of these new regulations will take more than 20 years to achieve. In an effort to achieve the benefits sooner, several states have proposed additional regulatory strategies to reduce emissions for existing engines.



Data logger in installed gray box above Thomas bus soot filter.

To verify that soot filters would be a suitable technology for reducing Department of Defense (DoD) diesel engine PM emissions, the ESTCP sponsored a demonstration project that included laboratory testing, field



# The demonstration showed that soot filters can be effective in reducing particulate matter emissions from diesel engines.

investigations, and the field demonstrations. In the laboratory phase, filter aging tests were performed to obtain an estimate of the expected filter life. This work suggests that soot filters should last from five to 12 years in typical DoD applications. In the field demonstration phase, 10 engines located at various DoD field activities in Southern California were used. Soot filters were installed in place of the existing mufflers on buses, stake trucks, and trailer-mounted portable generators. The filters were field tested over a four- to nine-month period using the engine's normal duty cycle. At the completion of the demonstration, the filters were returned to their manufacturers for destructive analysis. This analysis identified some required minor design changes and supported the previous filter life estimates.

The CSFs demonstrated by the project were composed of a ceramic substrate washcoated with a platinum-based catalyst. Such a system, developed by Engelhard, Inc., oxidizes the trapped soot at temperatures as low as 360 degrees Celsius, in essence cleaning out the filter. This regeneration method is referred to as passive since no external heat energy enters into the system to achieve soot oxidation. Rather, the system relies on the duty cycle of the engine to generate high enough temperatures to initiate soot combustion. Unfortunately, many light-duty engines do not generate exhaust temperatures conducive to passive regeneration of soot filters. Even heavy-duty engines operating under light load conditions or in cold weather can

result in partial or complete plugging of the filter, thereby, inducing high engine back-pressures, reduced engine power, and unsuccessful vehicle operation. These factors limit the potential applications for CSFs to highly loaded, heavy-duty diesel engines (like those in highway buses).


The second type of soot filter tested was the Rypos, Inc. electrically regenerated active soot filter. The Rypos system applies an electrical current to supply the heat energy to oxidize the soot and regenerate the filter. Rypos uses a novel approach to electrically regenerating filters. Rypos developed a sintered metal fiber media that acts as the substrate to capture particulate matter as well as the resistive element by which an electric current can be supplied to produce the heat to oxidize the soot. This material is unique in that it performs both functions, thereby reducing system size and manufacturing cost. The filter is composed of multiple cartridges that are regenerated separately and sequentially. This results in a lower instantaneous power consumption and a reduced fuel penalty. Electrically regenerated soot filters are particularly attractive for diesel generator applications since the required electric power source is already available.

During the laboratory testing and at the completion of the project, several air pollution emissions and fuel mileage tests were performed with both the filters installed and removed. The results from this testing



Air Force tactical diesel generator with Rypos soot filter installed on top of unit.

were PM reductions between 47 percent and 99 percent depending on test method and driving cycle, and statistically insignificant decreases in fuel mileage.

NFESC's demonstration project showed that soot filters can be effective in reducing diesel engine PM emissions. Although soot filters are not appropriate for all potential DoD applications, they can be used as part of a comprehensive program to reduce overall PM emissions at the activity level. Since soot filters have a relatively low purchase and installation cost of \$5 to \$10K per application, and a very low annual operating cost of less than \$500, they can be a cheaper fix than addressing other PM sources. Additional project results and cost information along with information on potential equipment suppliers can be found at the ESTCP web site: <http://www.estcp.org/projects/compliance/>. 

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# Improved Storm Water

## Monitoring Technology

### Wireless Network Links Remote Sites to Master Receiving Station

**T**he Naval Facilities Engineering Service Center (NFESC) in partnership with the Space and Warfare Command (SPAWAR), San Diego developed and demonstrated a

remotely operated and automated enhanced storm water monitoring system at Naval Station (NAVSTA) San Diego. This monitoring technology is based on a wireless network that links each remote site to a master receiving station using packet radio technology. Each remote site contains a sampler, remote terminal unit (RTU), a transceiver (packet radio) and a solar panel to provide reliable/renewable electrical power for the system. Commands/control can be issued via a master station to each remote site. This wireless network allows for complete communica-

tion between a central station and the remote sites. Users logging on to the Central Control Station can assess the status and readiness of the samplers as well as remotely operate them. Data collected by the samplers (including

flow, turbidity and conductivity) are transmitted in real time to the central station for logging and if necessary, activating the sampling process. Currently, three sites are fully operational with transceivers, samplers and repeaters.

Storm water monitoring is an important element not only for permit compliance but also for designing and implementing an effective storm water



Remote site pier configuration at Naval Station San Diego.



Remote site at the Graving Dock Naval Station San Diego.

program at Department of Defense (DoD) activities. Previous studies noted that the highest concentrations of contaminants are found in the “first flush” discharges, which occur during the first major storm event after an extended dry period. The ability to reliably collect the “first flush” samples is essential to assess the effectiveness of the storm water program.

Improvement to the prevalent and current automated data collection technique was made by programming the embedded controller within the sampler to reflect the correct sequence of events such as: time and amount of rainfall, time and duration of pump operation, time and duration of flow sensor activation. This capability is needed to identify the correct sampling time relative to the rain event as well as assisting facilities to monitor illicit discharges from industrial operations. The electrical power system was also redesigned and tested to include solar panels providing increased reliability and readiness of the sampler to handle storm events.

Although the primary benefit of this technology is to improve the performance of conventional samplers, expected cost savings are realized by reducing time and resources required for maintenance and inspection. Other expected benefits include:

- Enabling DoD activities to comply with storm water regulations,
- Allowing users to remotely monitor and control the status and operation of each sampler without the need to visit a large number of sites,
- Improving readiness and reliability of automated samplers by identifying problems in real-time and thus allow timely maintenance and repair,
- Avoiding unsafe working conditions during storms, and
- Reducing resources needed for maintenance and increased data quality. ⚓



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Smarter

# Weed Control

## New Technology Reduces Chemicals and Labor Required

Several military installations are using a new technology for controlling weeds that reduces pesticide use, cuts costs by more than 75 percent and reduces labor costs by 50 percent.

The new technology, called the “WeedSeeker® Sensor,” is a patented technology that uses advanced optics and computer circuitry to detect the

presence of weeds. Once a weed is detected, through its chlorophyll matter, the signal prompts the WeedSeeker® to apply the chemical to the detected weeds. (More specifically, the signal tells the system controller to open a solenoid valve and activate the spray pump.) The pump operating pressure ranges from 20 to 40 pounds per square inch (psi). The

spray system is calibrated to deliver enough spray mix through the nozzles mounted in the boom of the device. Any excess material flows back into the chemical tank to agitate the solution.

A complete system mounted on a cart includes: one 6 x 4 gas John Deere Gator motor, a model DB 210 (10 spray heads) or DB212 (12 spray heads) weed sensors with valve





Once a weed is detected, through its chlorophyll matter, the signal prompts the WeedSeeker to apply the chemical to the detected weeds.



cartridges, one CP600 controller, associated cables and piping system, a breakaway/folding boom, one 55-gallon chemical tank, one 14-gallon fresh water tank and one 12-volt pump. The estimated cost for a complete system with 10 sensors is around \$23,000.

### Application

A Model 210 WeedSeeker®, manufactured by Patchen, was successfully tested at Eglin Air Force Base (AFB), Florida by the personnel from the Civil Engineering Pest Management Program. The one-year weed control

test was conducted in parking lots, runways, taxiways, and in many other areas around the base. The environmental benefits and the cost savings were significant since there was a reduced amount of herbicide used and the labor hours required to apply them was greatly reduced.

The test was a conducted on a two-acre facility to eval-

uate the vendor's claim of cost savings and environmental benefits by comparing the performance of the WeedSeeker® to the previously authorized method of pesticide application—a hydraulic boom continuous sprayer manned by two maintenance personnel. As reported by Eglin AFB, the WeedSeeker® system was easier, simpler to use, and required only one person to operate. Test results showed that the WeedSeeker® system used only two gallons to eradicate the weeds at the two-acre area compared to the previous method that consumed eight gallons of pesticide to control

the weeds in the same area. Labor costs were reduced by 50 percent and the use of herbicides was reduced by 75 percent.

It was also reported that the WeedSeeker® sensors and herbicide application system can be adjusted to achieve the same results at an increased cart speed of 10 miles per hour. This results in an increase of work area coverage per unit time.

Current users of the WeedSeeker® include the Air Force bases at Nellis, Mountain Home, Minot Seymour Johnson, Langley, Lajes Field, and Hickam; Naval Air Station (NAS) Jacksonville; and NAS Norfolk. The WeedSeeker® system is available through the Navy's Pollution Prevention Equipment Program. ⚓

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# CHIMP

## Doesn't Crimp New London

### Naval Submarine Base Runs Successful Consolidated Hazardous Material Management Center

For the past nine years, Naval Submarine Base (SUBASE) New London, CT has enjoyed greater efficiencies and environmental compliance status due largely to its Consolidated Hazardous Materials Reutilization and Inventory Management (CHIMP) Center.

Personnel from Commands across SUBASE New London often use various types of hazardous materials during

their daily routines. In the past, they stored and maintained their own supplies of hazardous materials in storage lockers near their facilities. But for several years now, whenever someone aboard SUBASE New London needs hazardous materials, they contact the Consolidated Hazardous Material Reutilization Inventory Management Program (CHIMP) Center.

The CHIMP Center consolidated the responsibilities of the various

Commands around SUBASE New London and now controls all hazardous products for 63 tenant Commands on the SUBASE and for the Coast Guard Academy.

The CHIMP Center is managed by 13 civilian employees, two members of the military and four contractors. These personnel maintain hazardous materials in a central warehouse, issue it to Command representatives and receive returns of unused materials. CHIMP personnel also pick up and deliver hazardous materials to SUBASE customers and collect and process hazardous waste for disposal. SUBASE New London CHIMP personnel also help to establish CHIMP centers throughout the Northeast Region and



The CHIMP Center on SUBASE New London consolidated the responsibilities of 63 tenant commands around the SUBASE. CHIMP Center personnel now control the hazardous materials for those commands and for the Coast Guard Academy.



Terry Maher punctures aerosol cans to empty out the remaining contents before disposing of them. An unpunctured can is treated as hazardous material due to the residual contents. The chemicals in the aerosol cans are released into a 30-gallon can, which is then turned over to the Environmental Department for disposal.





Rick Houde, a material handler at SUBASE New London's CHRIMP Center, moves used vehicle batteries into position to be disposed of with other hazardous waste. The batteries are turned into one of the CHRIMP Center's vendors for a one-to-one exchange for new vehicle batteries.



MS2 (SS) Jorge Caldero (front right) and MS1 (SS) Morris Roberts, both from the Combined Bachelor Quarters, meet with Memory Hankins, the Enhanced CHRIMP Afloat Technician, to update their Material Safety Data Sheets and their Authorized User List.

provide hazardous materials management services to all home ported submarines. In addition, they maintain the Material Safety Data Sheets (MSDS) for hazardous materials for the entire Northeast Region and the Coast Guard Academy and manage the Authorized User Lists (AUL) for the SUBASE and the Coast Guard Academy.

"It's not just a consolidation of materials, it's also a consolidation of functions," said Jehdia Bottinelli, manager of New London's CHRIMP Center. "We are the point of entry and the point of exit for hazardous materials. There were approximately 80 people procuring hazardous materials within our fence line. Now we have three people who procure hazardous materials. Instead of customers going to multiple places, they come here for all their hazardous material needs."

CHRIMP maintains several types of hazardous materials, including acids, corrosives, paints, oils and various other types of chemicals. What makes these items hazardous is, according to Bottinelli, their chemical constituents. Material Safety Data Sheets (MSDS)

profile each hazardous material and identify the components that make them "hazardous."

In addition to the hazardous aspect of the materials, CHRIMP Center employees also monitor the two types of shelf life for the materials. Items with a "Type 1" shelf life are non-extendable. However, CHRIMP Center employees look for innovative ways to utilize these materials to avoid wasting them.

"Marine coating has a Type 1 shelf life and when it expires, it's no longer useful for its military specification. An expired material may not be used in submarines because of a breakdown of key chemical components in the product" Bottinelli said. "But it's still good enough to use when painting a road sign. This is just one simple example of how we divert unused, expired hazardous material from the waste stream and put it to good use."

Materials with a "Type 2" shelf life can be extended if CHRIMP personnel determine that the material is still useable. Expiration dates vary depending on the material. However,

CHRIMP employees inspect the containers and the contents to see if they still are useable past their initial expiration date.

When hazardous material is to be disposed of, the CHRIMP Center has an accumulation area where the material can be properly prepared for disposal.

"We will prepare hazardous materials for shipping and take it to the Treatment, Storage & Disposal Facility operated by our Environmental Department," Bottinelli said. "They add the materials to the shipping manifest and delivery order for pick-up by the Defense Reutilization and Marketing Office (DRMO). We try to avoid sending materials to DRMO. We like to find another use for unused hazardous materials wherever possible."

To avoid reaching the point where SUBASE New London wastes hazardous materials, CHRIMP personnel set high and low limits on the items based on the demand level for the material at SUBASE New London and the Coast Guard Academy.



Personnel from the CHRIMP Center also maintain the Authorized User List (AUL) for the Base (and elsewhere). The AUL contains a listing of those work centers or personnel from each Command who are authorized to receive hazardous materials. The AUL also defines what specific types and quantities of hazardous material are required by the customer.

When one customer is finished using a product for their task, CHRIMP personnel will reissue the material to other customers until the container has been depleted.

rized to keep hazardous materials for up to seven days—with the exception of the Naval Submarine Support Facility (NSSF). NSSF is authorized to keep hazardous materials for up to ten days.

“This prevents Commands from stockpiling hazardous materials and creating a waste management problem,” Bottinelli said. “It also provides for a safer working environment. In the past, individual Commands had their own lockers for storing hazardous materials. Lockers were neglected and items were stored improperly. Some lockers contained several months’

The SUBASE New London CHRIMP Center maintains several types of hazardous materials, including acids, corrosives, paints, oils and various other types of chemicals. The Material Safety Data Sheets (MSDS) profiles each hazardous material and identifies the components make them “hazardous.” CHRIMP personnel manage the MSDS library for the entire Northeast Region and the Coast Guard Academy.

“This works out well because we avoid procuring material that won’t be used,” Bottinelli said. “A five-gallon can of monoethanolamine costs \$63.50 to procure and \$86.00 to waste. We avoid any unnecessary procurement and waste costs of this product. That’s a huge savings for us.”

When CHRIMP personnel issue hazardous materials, they track the items to ensure that unused portions are returned within the specified timeframe. According to Bottinelli, Commands aboard SUBASE New London are autho-

worth of material. Now that we’ve restricted Commands to a seven- to ten-day supply, they’re able to more efficiently manage those supplies.”

CHRIMP representatives also inspect Commands’ hazardous material lockers to ensure that they are in compliance with SUBASE New London’s safety procedures.

In the nine years since the CHRIMP Center was established, it has been successful at properly managing hazardous materials across SUBASE New London. Ongoing support from each of the tenant Commands has certainly helped to underscore the success of the CHRIMP Center.

“CHRIMP Center personnel and our customers make this program a success. It takes an enduring commitment from our staff and customers to maintain compliance every day,” she said. “The program benefits everybody because it consolidates both materials and function into a single facility. It’s easier to use us and be in compliance now. That’s the real key to our success.” ⚓

*Photos and draft by JO1 (SW/AW)  
Mark Savage.*

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# What Everyone Is TALKING ABOUT

## Spring Issue of Currents Draws Rave Reviews

*The spring issue of Currents magazine drew rave reviews from many of our readers. Many of you were impressed with the diversity and quality of the content as well as the great design (especially the cover). Here's just a sampling of what we heard from some of our subscribers...*

"Very well written. Loved the cover. If that doesn't catch your attention, nothing will."

"I appreciate the time and effort you took to bring this important issue (critical habitat designations and INRMPS) to your readers. You did a terrific job of pulling together the pieces of this very complex, controversial, and emotional issue."

"Outstanding layout. The quality gets better and better. You're giving National Geographic a run for the money."

"Currents is the only environmental magazine that covers all of the facets of the environmental spectrum...from marine mammals to explosive ordnance."

"Currents depicts in sharp relief the challenge of balancing the obligation to provide suitable places for military training with obligations to protect endangered species."

"Another great issue, vibrant pictures and informative articles."

"Wow! You outdid yourself on this issue."

"Extremely informative...great color layout...written with today's issues and close-to-home problems in mind."

"The cover is stunning. The article on INRMPS and endangered species on Navy lands was well constructed and very informative."

"...well-written and presents the Navy's efforts to balance environmental stewardship and mission requirements in a visually engaging manner."

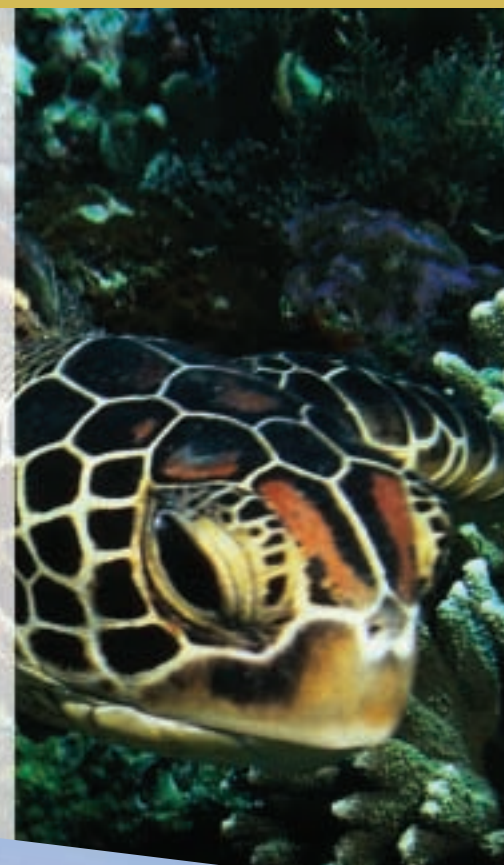
"An outstanding blend of editorial copy, exquisite photographs and compelling topics that truly separates the spring issue of Currents magazine from other environmental publications."

"I was captivated by the cover and informed by the content."

"Currents turns the passive reader into an active participant."

*If you want to find out what everyone is talking about, we encourage you to subscribe to Currents. It's easy and free. Those of you with "dot-mil" email addresses can subscribe to the magazine via the Naval Air Systems Command's environmental web site at <https://www.enviro-navair.navy.mil>. For everyone else, you can subscribe by sending a message to [currents@navair.navy.mil](mailto:currents@navair.navy.mil) with your complete mailing address.*

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